Priority Development Project (PDP) Storm Water Quality Management Plan (SWQMP)

Healthpeak Properties, Inc. 3020 Callan Road

PTS# xxxxxx

Dwg. xxxxx-D

Check if electing for offsite alternative compliance

Engineer of Work:

Tammie Moreno P.E. 7441

74417

Provide Wet Signature and Stamp Above

Prepared For:

Healthpeak Properties, Inc. 3020 Callan Road 420 Stevens Avenue, Suite 170 Solana Beach, Ca 92075 858-847-9936 Prepared By:

Kimley-Horn
401 B Street, Suite 600
San Diego, CA 92101
(619) 234-9411
Date:
January 2020

Approved by: City of San Diego

Date



THIS PAGE INTE	INTIONALLY LEFT	BLANK FOR DOU	BLE-SIDED PRINTING

Table of Contents

- Acronyms
- Certification Page
- Submittal Record
- Project Vicinity Map
- FORM DS-560: Storm Water Applicability Checklist
- FORM I-1: Applicability of Permanent, Post-Construction Storm Water BMP Requirements
- HMP Exemption Exhibit (for all hydromodification management exempt projects)
- FORM I-3B: Site Information Checklist for PDPs
- FORM I-4B: Source Control BMP Checklist for PDPs
- FORM I-5B: Site Design BMP Checklist PDPs
- FORM I-6: Summary of PDP Structural BMPs
- Attachment 1: Backup for PDP Pollutant Control BMPs
 - Attachment 1a: DMA Exhibit
 - Attachment 1b: Tabular Summary of DMAs (Worksheet B-1 from Appendix B) and Design Capture Volume Calculations
 - Attachment 1c: FORM I-7: Worksheet B.3-1 Harvest and Use Feasibility Screening
 - Attachment 1d: Infiltration Feasibility Information(One or more of the following):
 - FORM I-8A: Worksheet C.4-1 Categorization of Infiltration Feasibility Condition based on Geotechnical Conditions
 - Form I-8B: Worksheet C.4-2 Categorization of Infiltration Feasibility Condition based on Groundwater and Water Balance Conditions
 - Infiltration Feasibility Condition Letter
 - Worksheet C.4-3: Infiltration and Groundwater Protection for Full Infiltration BMPs
 - FORM I-9: Worksheet D.5-1 Factor of Safety and Design Infiltration Rate
 - o Attachment 1e: Pollutant Control BMP Design Worksheets / Calculations
- Attachment 2: Backup for PDP Hydromodification Control Measures
 - o Attachment 2a: Hydromodification Management Exhibit
 - o Attachment 2b: Management of Critical Coarse Sediment Yield Areas
 - o Attachment 2c: Geomorphic Assessment of Receiving Channels
 - o Attachment 2d: Flow Control Facility Design



- Attachment 3: Structural BMP Maintenance Plan
 - o Maintenance Agreement (Form DS-3247) (when applicable)
- Attachment 4: Copy of Plan Sheets Showing Permanent Storm Water BMPs
- Attachment 5: Project's Drainage Report
- Attachment 6: Project's Geotechnical and Groundwater Investigation Report



Acronyms

APN Assessor's Parcel Number

ASBS Area of Special Biological Significance

BMP Best Management Practice

CEQA California Environmental Quality Act

CGP Construction General Permit
DCV Design Capture Volume
DMA Drainage Management Areas
ESA Environmentally Sensitive Area
GLU Geomorphic Landscape Unit

GW Ground Water

HMP Hvdromodification Management Plan

HSG Hvdrologic Soil Group HU Harvest and Use INF Infiltration

LID Low Impact Development

LUP Linear Underground/Overhead Projects
MS4 Municipal Separate Storm Sewer System

N/A Not Applicable

NPDES National Pollutant Discharge Elimination System

NRCS Natural Resources Conservation Service

PDP Priority Development Proiect

PE Professional Engineer
POC Pollutant of Concern
SC Source Control

SD Site Design

SDRWQCB San Diego Regional Water Ouality Control Board

SIC Standard Industrial Classification
SWPPP Stormwater Pollutant Protection Plan
SWOMP Storm Water Quality Management Plan

TMDL Total Maximum Daily Load

WMAA Watershed Management Area Analysis
WPCP Water Pollution Control Program
WQIP Water Quality Improvement Plan



Project Name: Healthpeak Properties, Inc. 3020 Callan Road

Certification Page

Project Name: Permit Application

I hereby declare that I am the Engineer in Responsible Charge of design of storm water BMPs for this project, and that I have exercised responsible charge over the design of the project as defined in Section 6703 of the Business and Professions Code, and that the design is consistent with the requirements of the Storm Water Standards, which is based on the requirements of SDRWQCB Order No. R9-2013-0001 as amended by R9-2015-0001 and R9-2015-0100 (MS4 Permit).

I have read and understand that the City Engineer has adopted minimum requirements for managing urban runoff, including storm water, from land development activities, as described in the Storm Water Standards. I certify that this PDP SWQMP has been completed to the best of my ability and accurately reflects the project being proposed and the applicable source control and site design BMPs proposed to minimize the potentially negative impacts of this project's land development activities on water quality. I understand and acknowledge that the plan check review of this PDP SWQMP by the City Engineer is confined to a review and does not relieve me, as the Engineer in Responsible Charge of design of storm water BMPs for this project, of my responsibilities for project design.

Engineer of Work's Signature				
74417	9-30-21			
PE#	Expiration Date			
Tammie Moreno				
Print Name				
Kimley-Horn and Associates				
Company				
2-6-2020	CD PROFESS/ON			
Date	SERVICE C. MORE			



Engineer's Stamp

Submittal Record

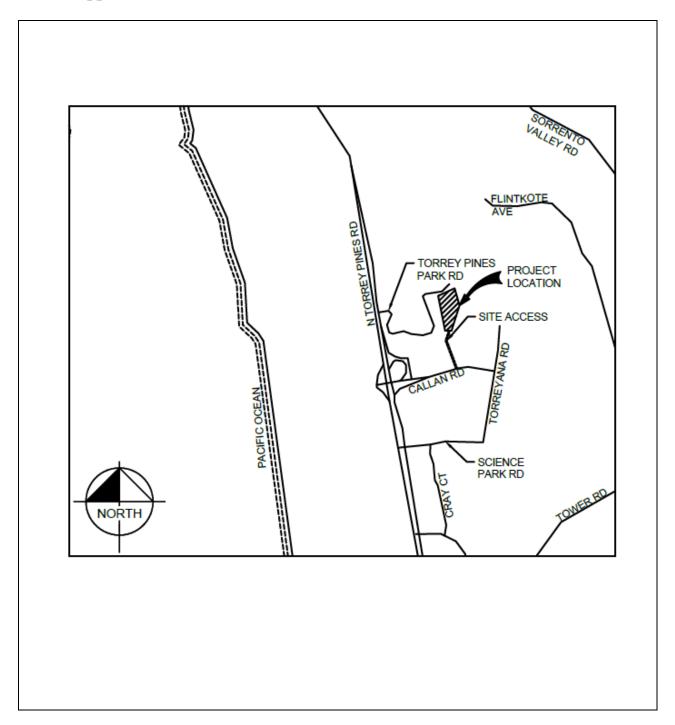
Use this Table to keep a record of submittals of this PDP SWQMP. Each time the PDP SWQMP is re-submitted, provide the date and status of the project. In last column indicate changes that have been made or indicate if response to plancheck comments is included. When applicable, insert response to plancheck comments.

Submittal Number	Date	Project Status	Changes
1		Preliminary Design/Planning/CEQA Final Design	Initial Submittal
2		Preliminary Design/Planning/CEQA Final Design	
3		Preliminary Design/Planning/CEQA Final Design	
4		Preliminary Design/Planning/CEQA Final Design	



Project Vicinity Map

Project Name: Permit Application





City of San Diego Form DS-560 Storm Water Requirements Applicability Checklist

Attach DS-560 form.





Storm Water Requirements Applicability Checklist

FORM

DS-560

November 2018

Project Address:	Project Number:			
SECTION 1. Construction Storm Water BMP Requirements:				
All construction sites are required to implement construction BMPs in accordance in the <u>Storm Water Standards Manual</u> . Some sites are additionally required to Construction General Permit (CGP) ¹ , which is administered by the State Regional	e with the performance standards obtain coverage under the State Il Water Quality Control Board.			
For all projects complete PART A: If project is required to submit a SWPPP or WPCP, continue to PART B.				
PART A: Determine Construction Phase Storm Water Requirements.				
 Is the project subject to California's statewide General NPDES permit for Storn with Construction Activities, also known as the State Construction General Per land disturbance greater than or equal to 1 acre.) 	n Water Discharges Associated mit (CGP)? (Typically projects with			
Yes; SWPPP required, skip questions 2-4 No; next question				
2. Does the project propose construction or demolition activity, including but no grubbing, excavation, or any other activity resulting in ground disturbance and	t limited to, clearing, grading, d/or contact with storm water?			
Yes; WPCP required, skip questions 3-4 No; next question				
3. Does the project propose routine maintenance to maintain original line and g nal purpose of the facility? (Projects such as pipeline/utility replacement)	rade, hydraulic capacity, or origi-			
Yes; WPCP required, skip question 4				
4. Does the project only include the following Permit types listed below?				
 Electrical Permit, Fire Alarm Permit, Fire Sprinkler Permit, Plumbing Permit, Spa Permit. 	Sign Permit, Mechanical Permit,			
 Individual Right of Way Permits that exclusively include only ONE of the foll sewer lateral, or utility service. 	owing activities: water service,			
 Right of Way Permits with a project footprint less than 150 linear feet that e the following activities: curb ramp, sidewalk and driveway apron replacement replacement, and retaining wall encroachments. 	exclusively include only ONE of ent, pot holing, curb and gutter			
Yes; no document required				
Check one of the boxes below, and continue to PART B:				
If you checked "Yes" for question 1, a SWPPP is REQUIRED. Continue to PART B				
If you checked "No" for question 1, and checked "Yes" for question a WPCP is REQUIRED. If the project proposes less than 5,000 squ of ground disturbance AND has less than a 5-foot elevation changentire project area, a Minor WPCP may be required instead. Cont	lare feet se over the			
If you checked "No" for all questions 1-3, and checked "Yes" for que PART B does not apply and no document is required. Continue	estion 4 e to Section 2.			
1. Mare information on the City's construction DMD requirements as well as CCD assumption	ate can be found at			
 More information on the City's construction BMP requirements as well as CGP requirements www.sandiego.gov/stormwater/regulations/index.shtml 	its can be iound at:			

Pa	ge 2 of 4	City of San Diego • Development Services • Storm Water Requirements Applicability Che	ecklist	
PART B: Determine Construction Site Priority				
Thi The Pro Cit Sta and nif	is prioritiz e city rese ojects are y has aligr ite Constri d receiving icance (AS	ation must be completed within this form, noted on the plans, and included in the SW rves the right to adjust the priority of projects both before and after construction. Co assigned an inspection frequency based on if the project has a "high threat to water qued the local definition of "high threat to water quality" to the risk determination approuction General Permit (CGP). The CGP determines risk level based on project specific significant water risk. Additional inspection is required for projects within the Areas of Special BS) watershed. NOTE: The construction priority does NOT change construction BMP projects; rather, it determines the frequency of inspections that will be conducted by	nstruction uality." The bach of the sediment risk Biological Sig- requirements	
Co	mplete P	ART B and continued to Section 2		
1.		ASBS		
		a. Projects located in the ASBS watershed.		
2.		High Priority		
		a. Projects that qualify as Risk Level 2 or Risk Level 3 per the Construction General P (CGP) and not located in the ASBS watershed.	ermit	
		b. Projects that qualify as LUP Type 2 or LUP Type 3 per the CGP and not located in t watershed.	he ASBS	
3.		Medium Priority		
		a. Projects that are not located in an ASBS watershed or designated as a High priorit	y site.	
		b. Projects that qualify as Risk Level 1 or LUP Type 1 per the CGP and not located in a watershed.	an ASBS	
		 c. WPCP projects (>5,000sf of ground disturbance) located within the Los Penasquito watershed management area. 	OS	
4.		Low Priority		
		a. Projects not subject to a Medium or High site priority designation and are not local watershed.	ated in an ASBS	
SE	CTION 2.	Permanent Storm Water BMP Requirements.		
Ad	ditional in	formation for determining the requirements is found in the <u>Storm Water Standards M</u>	lanual.	
PA Provel	RT C: De	termine if Not Subject to Permanent Storm Water Requirements. are considered maintenance, or otherwise not categorized as "new development pro- rojects" according to the Storm Water Standards Manual are not subject to Permanen	jects" or "rede-	
If '	yes" is c nt Storm	hecked for any number in Part C, proceed to Part F and check "Not Subje າ Water BMP Requirements".	ct to Perma-	
lf '	'no" is ch	necked for all of the numbers in Part C continue to Part D.		
1.	Does the existing	e project only include interior remodels and/or is the project entirely within an enclosed structure and does not have the potential to contact storm water?	☐ Yes ☐ No	
2.		e project only include the construction of overhead or underground utilities without new impervious surfaces?	☐ Yes ☐ No	
3.	roof or e	e project fall under routine maintenance? Examples include, but are not limited to: exterior structure surface replacement, resurfacing or reconfiguring surface parking xisting roadways without expanding the impervious footprint, and routine nent of damaged pavement (grinding, overlay, and pothole repair).	☐ Yes ☐ No	

Pag	ge 3 of 4 City of San Diego • Development Services • Storm Water Requirements Applicability Che	cklist
PA	RT D: PDP Exempt Requirements.	
PD	OP Exempt projects are required to implement site design and source control BMI	Ps.
	"yes" was checked for any questions in Part D, continue to Part F and check the b DP Exempt."	ox labeled
	"no" was checked for all questions in Part D, continue to Part E.	
1.	Does the project ONLY include new or retrofit sidewalks, bicycle lanes, or trails that:	
	 Are designed and constructed to direct storm water runoff to adjacent vegetated are non-erodible permeable areas? Or; 	as, or other
	 Are designed and constructed to be hydraulically disconnected from paved streets ar Are designed and constructed with permeable pavements or surfaces in accordance of Green Streets guidance in the City's Storm Water Standards manual? 	-
	☐ Yes; PDP exempt requirements apply ☐ No; next question	
2.	Does the project ONLY include retrofitting or redeveloping existing paved alleys, streets or roa and constructed in accordance with the Green Streets guidance in the City's Storm Water Stan	ids designed dards Manual?
	\square Yes; PDP exempt requirements apply \square No; project not exempt.	
a S If " ori If "Si	ojects that match one of the definitions below are subject to additional requirements including Storm Water Quality Management Plan (SWQMP). "yes" is checked for any number in PART E, continue to PART F and check the box ity Development Project". "no" is checked for every number in PART E, continue to PART F and check the box tandard Development Project".	labeled "Pri-
1.	New Development that creates 10,000 square feet or more of impervious surfaces collectively over the project site. This includes commercial, industrial, residential, mixed-use, and public development projects on public or private land.	☐ Yes ☐ No
2.	Redevelopment project that creates and/or replaces 5,000 square feet or more of impervious surfaces on an existing site of 10,000 square feet or more of impervious surfaces. This includes commercial, industrial, residential, mixed-use, and public development projects on public or private land.	☐ Yes ☐ No
3.	New development or redevelopment of a restaurant. Facilities that sell prepared foods and drinks for consumption, including stationary lunch counters and refreshment stands selling prepared foods and drinks for immediate consumption (SIC 5812), and where the land development creates and/or replace 5,000 square feet or more of impervious surface.	ng Yes No
4.	New development or redevelopment on a hillside. The project creates and/or replaces 5,000 square feet or more of impervious surface (collectively over the project site) and where the development will grade on any natural slope that is twenty-five percent or greater.	☐ Yes ☐ No
5.	New development or redevelopment of a parking lot that creates and/or replaces 5,000 square feet or more of impervious surface (collectively over the project site).	☐ Yes ☐ No
6.	New development or redevelopment of streets, roads, highways, freeways, and driveways. The project creates and/or replaces 5,000 square feet or more of impervious surface (collectively over the project site).	☐ Yes ☐ No

P	age 4 of 4 City of San Diego • Development Services • Storm Water Requirements Applicability Chec	klist
7.	New development or redevelopment discharging directly to an Environmentally Sensitive Area. The project creates and/or replaces 2,500 square feet of impervious surface (collectively over project site), and discharges directly to an Environmentally Sensitive Area (ESA). "Discharging directly to" includes flow that is conveyed overland a distance of 200 feet or less from the project to the ESA, or conveyed in a pipe or open channel any distance as an isolated flow from the project to the ESA (i.e. not commingled with flows from adjacent lands).	□ Yes □ No
8.	. New development or redevelopment projects of a retail gasoline outlet (RGO) that create and/or replaces 5,000 square feet of impervious surface. The development project meets the following criteria: (a) 5,000 square feet or more or (b) has a projected Average Daily Traffic (ADT) of 100 or more vehicles per day.	☐ Yes ☐ No
9.	. New development or redevelopment projects of an automotive repair shops that creates and/or replaces 5,000 square feet or more of impervious surfaces. Development projects categorized in any one of Standard Industrial Classification (SIC) codes 5013, 5014, 5541, 7532-7534, or 7536-7539.	☐ Yes ☐ No
10	O. Other Pollutant Generating Project. The project is not covered in the categories above, results in the disturbance of one or more acres of land and is expected to generate pollutants post construction, such as fertilizers and pesticides. This does not include projects creating less than 5,000 sf of impervious surface and where added landscaping does not require regular use of pesticides and fertilizers, such as slope stabilization using native plants. Calculation of the square footage of impervious surface need not include linear pathways that are for infrequivehicle use, such as emergency maintenance access or bicycle pedestrian use, if they are built with pervious surfaces of if they sheet flow to surrounding pervious surfaces.	
	ART F: Select the appropriate category based on the outcomes of PART C through P	ART E.
1.	· · · · · · · · · · · · · · · · · · ·	
2.	The project is a STANDARD DEVELOPMENT PROJECT . Site design and source control BMP requirements apply. See the <u>Storm Water Standards Manual</u> for guidance.	
3.	The project is PDP EXEMPT . Site design and source control BMP requirements apply. See the <u>Storm Water Standards Manual</u> for guidance.	
4.	The project is a PRIORITY DEVELOPMENT PROJECT . Site design, source control, and structural pollutant control BMP requirements apply. See the <u>Storm Water Standards Manual</u> for guidance on determining if project requires a hydromodification plan management	٥
	lame of Owner or Agent (<i>Please Print</i>) Janua Muus ignature Date	

Project Name	e:				
	INITENITION	ALLY LEFT I	BLANK FOR I	OOUBLE-SIDEI	PRINTING
THIS PAGE	INTENTIONA			00000	
THIS PAGE	INTENTION				
THIS PAGE	INTENTION				
THIS PAGE	INTENTION				
THIS PAGE	INTENTION				
THIS PAGE	INTENTION				
THIS PAGE	INTENTION				
THIS PAGE	INTENTION				
THIS PAGE	INTENTION				
THIS PAGE	INTENTION				
THIS PAGE	INTENTION				



Applicability of Permane		Form I-1		
	r BMP Requi	rements		
	entification			
Project Name:				
Permit Application Number:		Date:		
Determination				
The purpose of this form is to identify permanent project. This form serves as a short <u>summary</u> of a separate forms that will serve as the backup for the Answer each step below, starting with Step 1 and "Stop". Refer to the manual sections and/or separate	pplicable requ he determinati progressing th	irements, in some cases referencing ion of requirements.		
Step	Answer	Progression		
Step 1: Is the project a "development project"? See Section 1.3 of the manual	□ Yes	Go to Step 2.		
(Part 1 of Storm Water Standards) for guidance.	□ No	Stop. Permanent BMP requirements do not apply. No SWQMP will be required. Provide discussion below.		
Step 2: Is the project a Standard Project, PDP, or	☐ Standard	Stop. Standard Project		
PDP Exempt?	Project	requirements apply		
To answer this item, see Section 1.4 of the manual in its entirety for guidance AND	□ PDP	PDP requirements apply, including PDP SWQMP. Go to Step 3 .		
complete Form DS-560, Storm Water	PDP	Stop. Standard Project		
Requirements Applicability Checklist.	Exempt	requirements apply. Provide discussion and list any additional requirements below.		
Discussion / justification, and additional requirements for exceptions to PDP definitions, if				
applicable:				



Form I-1	Page 2 of 2		
Step	Answer	Progression	
Step 3. Is the project subject to earlier PDP requirements due to a prior lawful approval? See Section 1.10 of the manual (Part 1 of Storm Water Standards) for guidance.	□ Yes	Consult the City Engineer to determine requirements. Provide discussion and identify requirements below. Go to Step 4 .	
, 0	□ No	BMP Design Manual PDP requirements apply. Go to Step 4 .	
Discussion / justification of prior lawful approval, lawful approval does not apply):	and identify re	equirements (<u>not required if prior</u>	
Step 4. Do hydromodification control requirements apply? See Section 1.6 of the manual (Part 1 of Storm Water Standards) for guidance.	□ Yes	PDP structural BMPs required for pollutant control (Chapter 5) and hydromodification control (Chapter 6). Go to Step 5 .	
	□ No	Stop. PDP structural BMPs required for pollutant control (Chapter 5) only. Provide brief discussion of exemption to hydromodification control below.	
Discussion / justification if hydromodification con	trol requireme	ents do <u>not</u> apply:	
Step 5. Does protection of critical coarse sediment yield areas apply? See Section 6.2 of the manual (Part 1 of Storm Water Standards) for guidance.	□ Yes	Management measures required for protection of critical coarse sediment yield areas (Chapter 6.2). Stop.	
	□ No	Management measures not required for protection of critical coarse sediment yield areas. Provide brief discussion below. Stop.	
Discussion / justification if protection of critical coarse sediment yield areas does <u>not</u> apply:			



HMP Exemption Exhibit

Attach a HMP Exemption Exhibit that shows direct storm water runoff discharge from the project site to HMP exempt area. Include project area applicable underground storm drain line and/or concrete lined channels, of the linformation and exempt waterbody.

Referents applicable drawing number(s).

Khibit must be provided on 11"x17" or larger paper.



Project Name:				
THIS PAGE INTEN	ITIONALLY LEFT	BLANK FOR DO	UBLE-SIDED PRIN	TING



Site Information Checklist Form I-3B		Form L2R
	For PDPs	FUITI F3D
Project Sum	mary Information	
Project Name		
Project Address		
Assessor's Parcel Number(s) (APN(s))		
Permit Application Number		
Project Watershed	Select One: San Dieguito River Penasquitos Mission Bay San Diego River San Diego Bay Tijuana River	
Hydrologic subarea name with Numeric Identifier up to two decimal places (9XX.XX)		
Project Area (total area of Assessor's Parcel(s) associated with the project or total area of the right-of- way)	Acres (Square Feet)
Area to be disturbed by the project (Project Footprint)	Acres (Square Feet)
Project Proposed Impervious Area (subset of Project Footprint)	Acres (Square Feet)
Project Proposed Pervious Area (subset of Project Footprint)	Acres (Square Feet)
Note: Proposed Impervious Area + Proposed Pe This may be less than the Project Area.	ervious Area = Area to	be Disturbed by the Project.
The proposed increase or decrease in impervious area in the proposed condition as compared to the pre-project condition	%	



Description of Existing Site Condition and Drainage Patterns Current Status of the Site (select all that apply): Existing development Previously graded but not built out Agricultural or other non-impervious use Vacant, undeveloped/natural Description / Additional Information:
 Existing development Previously graded but not built out Agricultural or other non-impervious use Vacant, undeveloped/natural
□ Previously graded but not built out □ Agricultural or other non-impervious use □ Vacant, undeveloped/natural
□ Agricultural or other non-impervious use □ Vacant, undeveloped/natural
□ Vacant, undeveloped/natural
Description / Additional Information:
Eviating Land Cover Includes (colect all that apply)
Existing Land Cover Includes (select all that apply):
□ Vegetative Cover
□ Non-Vegetated Pervious Areas
□ Impervious Areas
Description / Additional Information:
Underlying Soil belongs to Hydrologic Soil Group (select all that apply):
□ NRCS Type A
□ NRCS Type B
□ NRCS Type C
□ NRCS Type D
Approximate Depth to Groundwater:
☐ Groundwater Depth < 5 feet
□ 5 feet < Groundwater Depth < 10 feet
□ 10 feet < Groundwater Depth < 20 feet
□ Groundwater Depth > 20 feet
Existing Natural Hydrologic Features (select all that apply):
□ Watercourses
□ Seeps
□ Springs
□ Wetlands
□ None
Description / Additional Information:



Form I-3B Page 3 of 11

Description of Existing Site Topography and Drainage

How is storm water runoff conveyed from the site? At a minimum, this description should answer:

- Whether existing drainage conveyance is natural or urban; 1.
- 2. If runoff from offsite is conveyed through the site? If yes, quantification of all offsite drainage areas, design flows, and locations where offsite flows enter the project site and summarize how such flows are conveyed through the site;
- 3. Provide details regarding existing project site drainage conveyance network, including storm drains, concrete channels, swales, detention facilities, storm water treatment facilities, and natural and constructed channels:

4.	Identify all discharge locations from the existing project along with a summary of the conveyance system size and capacity for each of the discharge locations. Provide summary of the pre-project drainage areas and design flows to each of the existing runoff discharge locations.			
	Descriptions/Additional Information			
	·			



Form I-3B Page 4 of 11			
Description of Proposed Site Development and Drainage Patterns			
Project Description / Proposed Land Use and/or Activities:			
List/describe proposed impervious features of the project (e.g., buildings, roadways, parking lots, courtyards, athletic courts, other impervious features):			
List/describe proposed pervious features of the project (e.g., landscape areas):			
Does the project include grading and changes to site topography? ☐ Yes ☐ No Description / Additional Information:			



Form I-3B Page 5 of 11				
Does the project include changes to site drainage (e.g., installation of new storm water conveyance systems)? ☐ Yes ☐ No				
If yes, provide details regarding the proposed project site drainage conveyance network, including storm drains, concrete channels, swales, detention facilities, storm water treatment facilities, natural and constructed channels, and the method for conveying offsite flows through or around the proposed project site. Identify all discharge locations from the proposed project site along with a summary of the conveyance system size and capacity for each of the discharge locations. Provide a summary of pre and post-project drainage areas and design flows to each of the runoff discharge locations. Reference the drainage study for detailed calculations.				
Description / Additional Information:				



Form I-3B Page 6 of 11				
Identify whether any of the following features, activities, and/or pollutant source areas will be				
present (select all that apply):				
☐ Onsite storm drain inlets				
□ Interior floor drains and elevator shaft sump pumps				
□ Interior parking garages				
□ Need for future indoor & structural pest control				
□ Landscape/outdoor pesticide use				
□ Pools, spas, ponds, decorative fountains, and other water features				
□ Food service				
□ Refuse areas				
□ Industrial processes				
□ Outdoor storage of equipment or materials				
□ Vehicle and equipment cleaning				
□ Vehicle/equipment repair and maintenance				
☐ Fuel dispensing areas				
□ Loading docks				
□ Fire sprinkler test water				
□ Miscellaneous drain or wash water				
□ Plazas, sidewalks, and parking lots				
Description/Additional Information:				



Form I-3B Page 7 of 11 **Identification and Narrative of Receiving Water** Narrative describing flow path from discharge location(s), through urban storm conveyance system, to receiving creeks, rivers, and lagoons and ultimate discharge location to Pacific Ocean (or bay, lagoon, lake or reservoir, as applicable) Provide a summary of all beneficial uses of receiving waters downstream of the project discharge locations Identify all ASBS (areas of special biological significance) receiving waters downstream of the project discharge locations Provide distance from project outfall location to impaired or sensitive receiving waters Summarize information regarding the proximity of the permanent, post-construction storm water BMPs to the City's Multi-Habitat Planning Area and environmentally sensitive lands



Form I-3B Page 8 of 11

Identification of Receiving Water Pollutants of Concern

List any 303(d) impaired water bodies within the path of storm water from the project site to the Pacific Ocean (or bay, lagoon, lake or reservoir, as applicable), identify the pollutant(s)/stressor(s) causing impairment, and identify any TMDLs and/or Highest Priority Pollutants from the WQIP for the impaired water bodies:

303(d) Impaired Water Body (Refer to Appendix K)	Pollutant(s)/Stressor(s) (Refer to Appendix K)	TMDLs/WQIP Highest Priority Pollutant (Refer to Table 1-4 in Chapter 1)

Identification of Project Site Pollutants*

Identify pollutants anticipated from the project site based on all proposed use(s) of the site (see Appendix B.6):

Pollutant	Not Applicable to the Project Site	Anticipated from the Project Site	Also a Receiving Water Pollutant of Concern
Sediment			
Nutrients			
Heavy Metals			
Organic Compounds			
Trash & Debris			
Oxygen Demanding Substances			
Oil & Grease			
Bacteria & Viruses			
Pesticides			



^{*}Identification of project site pollutants is only required if flow-thru treatment BMPs are implemented onsite in lieu of retention or biofiltration BMPs (note the project must also participate in an alternative compliance program unless prior lawful approval to meet earlier PDP requirements is demonstrated)

Form I-3B Page 9 of 11
Hydromodification Management Requirements
Do hydromodification management requirements apply (see Section 1.6)?
$\hfill \Box$ Yes, hydromodification management flow control structural BMPs required.
$\hfill \square$ No, the project will discharge runoff directly to existing underground storm drains discharging
directly to water storage reservoirs, lakes, enclosed embayments, or the Pacific Ocean.
$\hfill \square$ No, the project will discharge runoff directly to conveyance channels whose bed and bank are
concrete-lined all the way from the point of discharge to water storage reservoirs, lakes, enclosed
embayments, or the Pacific Ocean.
$\hfill \square$ No, the project will discharge runoff directly to an area identified as appropriate for an exemption
by the WMAA for the watershed in which the project resides.
Description / Additional Information (to be provided if a 'No' answer has been selected above):
Note: If "No" answer has been selected the SWQMP must include an exhibit that shows the storm
water conveyance system from the project site to an exempt water body. The exhibit should include
details about the conveyance system and the outfall to the exempt water body.
Critical Coarse Sediment Yield Areas*
*This Section only required if hydromodification management requirements apply Based on Section 6.2 and Appendix H does CCSYA exist on the project footprint or in the upstream
area draining through the project footprint?
□ Yes
□ No
Discussion / Additional Information:
Discussion / Additional information.



Form I-3B Page 10 of 11

Flow Control for Post-Project Runon*			
*This Section only required if hydromodification management requirements apply			
List and describe point(s) of compliance (POCs) for flow control for hydromodification management			
(see Section 6.3.1). For each POC, provide a POC identification name or number correlating to the			
project's HMP Exhibit and a receiving channel identification name or number correlating to the			
project's HMP Exhibit.			
Has a geomorphic assessment been performed for the receiving channel(s)?			
\square No, the low flow threshold is 0.1Q ₂ (default low flow threshold)			
\square Yes, the result is the low flow threshold is 0.1Q $_2$			
☐ Yes, the result is the low flow threshold is 0.3Q ₂			
\square Yes, the result is the low flow threshold is $0.5Q_2$			
If a geomorphic assessment has been performed, provide title, date, and preparer:			
Discussion / Additional Information: (optional)			



Form I-3B Page 11 of 11
Other Site Requirements and Constraints
When applicable, list other site requirements or constraints that will influence storm water management design, such as zoning requirements including setbacks and open space, or local codes governing minimum street width, sidewalk construction, allowable pavement types, and drainage requirements.
Optional Additional Information or Continuation of Previous Sections As Needed
This space provided for additional information or continuation of information from previous sections as needed.



Source Control BMP Checklist for PDPs		Form I-4B		
Source Control BMPs				
All development projects must implement source control BMPs where applicable and feasible. See Chapter 4 and Appendix E of the BMP Design Manual (Part 1 of the Storm Water Standards) for information to implement source control BMPs shown in this checklist.				
 Answer each category below pursuant to the following. "Yes" means the project will implement the source control BMP as described in Chapter 4 and/or Appendix E of the BMP Design Manual. Discussion / justification is not required. "No" means the BMP is applicable to the project but it is not feasible to implement. Discussion / justification must be provided. "N/A" means the BMP is not applicable at the project site because the project does not include the feature that is addressed by the BMP (e.g., the project has no outdoor materials storage areas). Discussion / justification may be provided. 				
Source Control Requirement	Applied?		?	
4.2.1 Prevention of Illicit Discharges into the MS4	□ Yes	□No	□ N/A	
Discussion / justification if 4.2.1 not implemented:				
4.2.2 Storm Drain Stenciling or Signage	□ Yes	□ No	□ N/A	
Discussion / justification if 4.2.2 not implemented:				
4.2.3 Protect Outdoor Materials Storage Areas from Rainfall, Run- On, Runoff, and Wind Dispersal	□ Yes	□No	□ N/A	
Discussion / justification if 4.2.3 not implemented:				
4.2.4 Protect Materials Stored in Outdoor Work Areas from Rainfall, Run-On, Runoff, and Wind Dispersal	□ Yes	□No	□ N/A	
Discussion / justification if 4.2.4 not implemented:				
4.2.5 Protect Trash Storage Areas from Rainfall, Run-On, Runoff, and Wind Dispersal	□ Yes	□No	□ N/A	
Discussion / justification if 4.2.5 not implemented:				



Form I-4B Page 2 of 2			
Source Control Requirement Applied?			! ?
4.2.6 Additional BMPs Based on Potential Sources of Runoff Pollutants (must answer for each source listed below)			
On-site storm drain inlets	□ Yes	□ No	□ N/A
Interior floor drains and elevator shaft sump pumps	□ Yes	□ No	□ N/A
Interior parking garages	□ Yes	□ No	□ N/A
Need for future indoor & structural pest control	□ Yes	□ No	□ N/A
Landscape/Outdoor Pesticide Use	□ Yes	□ No	□ N/A
Pools, spas, ponds, decorative fountains, and other water features	□ Yes	□ No	□ N/A
Food service	□ Yes	□ No	□ N/A
Refuse areas	□ Yes	□ No	□ N/A
Industrial processes	□ Yes	□ No	□ N/A
Outdoor storage of equipment or materials	□ Yes	□ No	□ N/A
Vehicle/Equipment Repair and Maintenance	□ Yes	□ No	□ N/A
Fuel Dispensing Areas	□ Yes	□ No	□ N/A
Loading Docks	□ Yes	□ No	□ N/A
Fire Sprinkler Test Water	□ Yes	□ No	□ N/A
Miscellaneous Drain or Wash Water	□ Yes	□ No	□ N/A
Plazas, sidewalks, and parking lots	□ Yes	□ No	□ N/A
SC-6A: Large Trash Generating Facilities	□ Yes	□ No	□ N/A
SC-6B: Animal Facilities	□ Yes	□ No	□ N/A
SC-6C: Plant Nurseries and Garden Centers	□ Yes	□ No	□ N/A
SC-6D: Automotive Facilities	□ Yes	□ No	□ N/A
Discussion / justification if 4.2.6 not implemented. Clearly identify which are discussed. Justification must be provided for all "No" answers show		or runon	pollutarits



Form I-5B for PDPs Site Design BMPs All development projects must implement site design BMPs where applicable and feasible. See Chapter 4 and Appendix E of the BMP Design Manual (Part 1 of Storm Water Standards) for information to implement site design BMPs shown in this checklist. Answer each category below pursuant to the following. "Yes" means the project will implement the site design BMP as described in Chapter 4 and/or Appendix E of the BMP Design Manual. Discussion / justification is not required. "No" means the BMP is applicable to the project but it is not feasible to implement. Discussion / justification must be provided. "N/A" means the BMP is not applicable at the project site because the project does not include the feature that is addressed by the BMP (e.g., the project site has no existing natural areas to conserve). Discussion / justification may be provided. A site map with implemented site design BMPs must be included at the end of this checklist. Site Design Requirement Applied? 4.3.1 Maintain Natural Drainage Pathways and Hydrologic Features ☐ Yes □ No □ N/A Discussion / justification if 4.3.1 not implemented: Are existing natural drainage pathways and hydrologic 1-1 ☐ Yes □ No □ N/A features mapped on the site map? Are trees implemented? If yes, are they shown on the site 1-2 ☐ Yes □ No □ N/A map? Implemented trees meet the design criteria in 4.3.1 Fact ☐ Yes □ No □ N/A Sheet (e.g. soil volume, maximum credit, etc.)? 1-4 Is tree credit volume calculated using Appendix B.2.2.1 and ☐ Yes □ No □ N/A SD-1 Fact Sheet in Appendix E? 4.3.2 Have natural areas, soils and vegetation been conserved? ☐ Yes □ No □ N/A Discussion / justification if 4.3.2 not implemented:

Site Design BMP Checklist



Form I-5B Page 2 of 4				
Site Design Requirement		Applied?		
4.3.3 Minimize Impervious Area	□ Yes	□ No	□ N/A	
Discussion / justification if 4.3.3 not implemented:				
4.3.4 Minimize Soil Compaction	□ Yes	□No	□ N/A	
Discussion / justification if 4.3.4 not implemented:				
4.3.5 Impervious Area Dispersion	□ Yes	□ No	□ N/A	
Discussion / justification if 4.3.5 not implemented:				
5-1 Is the pervious area receiving runon from impervious area identified on the site map?	□ Yes	□No	□ N/A	
5-2 Does the pervious area satisfy the design criteria in 4.3.5 Fact Sheet in Appendix E (e.g. maximum slope, minimum length, etc.)	□ Yes	□No	□ N/A	
5-3 Is impervious area dispersion credit volume calculated using Appendix B.2.1.1 and 4.3.5 Fact Sheet in Appendix E?	□ Yes	□No	□ N/A	



Form I-5B Page 3 of 4					
Site Design Requirement	Applied?				
4.3.6 Runoff Collection	□ Yes	□ No	□ N/A		
Discussion / justification if 4.3.6 not implemented:					
6a-1 Are green roofs implemented in accordance with design criteria in 4.3.6A Fact Sheet? If yes, are they shown on the site map?	□ Yes	□No	□ N/A		
6a-2 Is the green roof credit volume calculated using Appendix B.2.1.2 and 4.3.6A Fact Sheet in Appendix E?	□ Yes	□No	□ N/A		
6b-1 Are permeable pavements implemented in accordance with design criteria in 4.3.6B Fact Sheet? If yes, are they shown on the site map?	□ Yes	□No	□ N/A		
6b-2 Is the permeable pavement credit volume calculated using Appendix B.2.1.3 and 4.3.6B Fact Sheet in Appendix	□ Yes	□No	□ N/A		
4.3.7 Land caping with Native or Drought Tolerant Species	□ Yes	□No	□ N/A		
Discussion / justification if 4.3.7 not implemented:					
4.3.8 Harvest and Use Precipitation	□ Yes	□ No	□ N/A		
Discussion / justification if 4.3.8 not implemented: 8-1 Are rain barrels implemented in accordance with design	□ Yes	□No	□ N/A		
criteria in 4.3.8 Fact Sheet? If yes, are they shown on the site map?			,, .		
8-2 Is the rain barrel credit volume calculated using Appendix B.2.2.2 and 4.3.8 Fact Sheet in Appendix E?	□ Yes	□No	□ N/A		





Summary of PDP Structural BMPs

Form I-6

PDP Structural BMPs

All PDPs must implement structural BMPs for storm water pollutant control (see Chapter 5 of the BMP Design Manual, Part 1 of Storm Water Standards). Selection of PDP structural BMPs for storm water pollutant control must be based on the selection process described in Chapter 5. PDPs subject to hydromodification management requirements must also implement structural BMPs for flow control for hydromodification management (see Chapter 6 of the BMP Design Manual). Both storm water pollutant control and flow control for hydromodification management can be achieved within the same structural BMP(s).

PDP structural BMPs must be verified by the City at the completion of construction. This includes requiring the project owner or project owner's representative to certify construction of the structural BMPs (complete Form DS-563). PDP structural BMPs must be maintained into perpetuity (see Chapter 7 of the BMP Design Manual).

Use this form to provide narrative description of the general strategy for structural BMP implementation at the project site in the box below. Then complete the PDP structural BMP summary information sheet (page 3 of this form) for each structural BMP within the project (copy the BMP summary information page as many times as needed to provide summary information for each individual structural BMP).

Describe the general strategy for structural BMP implementation at the site. This information must describe how the steps for selecting and designing storm water pollutant control BMPs presented in Section 5.1 of the BMP Design Manual were followed, and the results (type of BMPs selected). For projects requiring hydromodification flow control BMPs, indicate whether pollutant control and flow control BMPs are integrated or separate.

(Continue on page 2 as necessary.)



Form I-6 Page 2 of	
(Continued from page 1)	



Form I-6 Page of (Copy as many as needed)	
Structural BMP Summary Information	
Structural BMP ID No.	
Construction Plan Sheet No.	
Type of Structural BMP:	
□ Retention by harvest and use (e.g. HU-1, cistern)	
□ Retention by infiltration basin (INF-1)	
□ Retention by bioretention (INF-2)	
□ Retention by permeable pavement (INF-3)	
Partial retention by biofiltration with partial reter	ntion (PR-1)
☐ Biofiltration (BF-1)	
☐ Flow-thru treatment control with prior lawful approval to meet earlier PDP requirements (provide BMP type/description in discussion section below)	
□ Flow-thru treatment control included as pre-treatment/forebay for an onsite retention or	
biofiltration BMP (provide BMP type/description	-
biofiltration BMP it serves in discussion section below)	
☐ Flow-thru treatment control with alternative compliance (provide BMP type/description in	
discussion section below)	
$\hfill \square$ Detention pond or vault for hydromodification m	nanagement
$\hfill \Box$ Other (describe in discussion section below)	
Purpose:	
☐ Pollutant control only	
\square Hydromodification control only	
□ Combined pollutant control and hydromodification control	
$\hfill \square$ Pre-treatment/forebay for another structural BM	IP .
☐ Other (describe in discussion section below)	
Who will certify construction of this BMP?	
Provide name and contact information for the	
party responsible to sign BMP verification form DS-563	
D3-303	
Who will be the final owner of this BMP?	
Who will maintain this BMP into perpetuity?	
What is the funding mechanism for	
maintenance?	



Form I-6 Page of (Copy as many as needed)	
Structural BMP Summary Information	
Structural BMP ID No.	
Construction Plan Sheet No.	
Type of Structural BMP:	
□ Retention by harvest and use (e.g. HU-1, cistern)	
□ Retention by infiltration basin (INF-1)	
□ Retention by bioretention (INF-2)	
□ Retention by permeable pavement (INF-3)	
Partial retention by biofiltration with partial reter	ntion (PR-1)
☐ Biofiltration (BF-1)	
☐ Flow-thru treatment control with prior lawful approval to meet earlier PDP requirements (provide BMP type/description in discussion section below)	
□ Flow-thru treatment control included as pre-treatment/forebay for an onsite retention or	
biofiltration BMP (provide BMP type/description	-
biofiltration BMP it serves in discussion section below)	
☐ Flow-thru treatment control with alternative compliance (provide BMP type/description in	
discussion section below)	
$\hfill \square$ Detention pond or vault for hydromodification m	nanagement
$\hfill \Box$ Other (describe in discussion section below)	
Purpose:	
☐ Pollutant control only	
\square Hydromodification control only	
□ Combined pollutant control and hydromodification control	
$\hfill \square$ Pre-treatment/forebay for another structural BM	IP .
☐ Other (describe in discussion section below)	
Who will certify construction of this BMP?	
Provide name and contact information for the	
party responsible to sign BMP verification form DS-563	
D3-303	
Who will be the final owner of this BMP?	
Who will maintain this BMP into perpetuity?	
What is the funding mechanism for	
maintenance?	



Form I-6 Page of (Copy as many as needed)	
Structural BMP Summary Information	
Structural BMP ID No.	
Construction Plan Sheet No.	
Type of Structural BMP:	
□ Retention by harvest and use (e.g. HU-1, cistern)	
□ Retention by infiltration basin (INF-1)	
□ Retention by bioretention (INF-2)	
□ Retention by permeable pavement (INF-3)	
Partial retention by biofiltration with partial reter	ntion (PR-1)
☐ Biofiltration (BF-1)	
☐ Flow-thru treatment control with prior lawful approval to meet earlier PDP requirements (provide BMP type/description in discussion section below)	
□ Flow-thru treatment control included as pre-treatment/forebay for an onsite retention or	
biofiltration BMP (provide BMP type/description	-
biofiltration BMP it serves in discussion section below)	
☐ Flow-thru treatment control with alternative compliance (provide BMP type/description in	
discussion section below)	
$\hfill \square$ Detention pond or vault for hydromodification m	nanagement
$\hfill \Box$ Other (describe in discussion section below)	
Purpose:	
☐ Pollutant control only	
\square Hydromodification control only	
□ Combined pollutant control and hydromodification control	
$\hfill \square$ Pre-treatment/forebay for another structural BM	IP .
☐ Other (describe in discussion section below)	
Who will certify construction of this BMP?	
Provide name and contact information for the	
party responsible to sign BMP verification form DS-563	
D3-303	
Who will be the final owner of this BMP?	
Who will maintain this BMP into perpetuity?	
What is the funding mechanism for	
maintenance?	



Form I-6 Page of (Copy as many as needed)
Structural BMP ID No.
Construction Plan Sheet No.
Discussion (as needed; must include worksheets showing BMP sizing calculations in the SWQMPs):



Form I-6 Page of (Copy as many as needed)	
Structural BMP Summary Information	
Structural BMP ID No.	
Construction Plan Sheet No.	
Type of Structural BMP:	
□ Retention by harvest and use (e.g. HU-1, cistern)	
□ Retention by infiltration basin (INF-1)	
□ Retention by bioretention (INF-2)	
□ Retention by permeable pavement (INF-3)	
Partial retention by biofiltration with partial reter	ntion (PR-1)
☐ Biofiltration (BF-1)	
☐ Flow-thru treatment control with prior lawful approval to meet earlier PDP requirements (provide BMP type/description in discussion section below)	
□ Flow-thru treatment control included as pre-treatment/forebay for an onsite retention or	
biofiltration BMP (provide BMP type/description	-
biofiltration BMP it serves in discussion section below)	
☐ Flow-thru treatment control with alternative compliance (provide BMP type/description in	
discussion section below)	
$\hfill \square$ Detention pond or vault for hydromodification m	nanagement
$\hfill \Box$ Other (describe in discussion section below)	
Purpose:	
☐ Pollutant control only	
\square Hydromodification control only	
□ Combined pollutant control and hydromodification control	
$\hfill \square$ Pre-treatment/forebay for another structural BM	IP .
☐ Other (describe in discussion section below)	
Who will certify construction of this BMP?	
Provide name and contact information for the	
party responsible to sign BMP verification form DS-563	
D3-303	
Who will be the final owner of this BMP?	
Who will maintain this BMP into perpetuity?	
What is the funding mechanism for	
maintenance?	



Form I-6 Page of (Copy as many as needed)
Structural BMP ID No.
Construction Plan Sheet No.
Discussion (as needed; must include worksheets showing BMP sizing calculations in the SWQMPs):



Form I-6 Page of (Copy as many as needed)	
Structural BMP Summary Information	
Structural BMP ID No.	
Construction Plan Sheet No.	
Type of Structural BMP:	
□ Retention by harvest and use (e.g. HU-1, cistern)	
□ Retention by infiltration basin (INF-1)	
□ Retention by bioretention (INF-2)	
□ Retention by permeable pavement (INF-3)	
Partial retention by biofiltration with partial reter	ntion (PR-1)
☐ Biofiltration (BF-1)	
☐ Flow-thru treatment control with prior lawful approval to meet earlier PDP requirements (provide BMP type/description in discussion section below)	
□ Flow-thru treatment control included as pre-treatment/forebay for an onsite retention or	
biofiltration BMP (provide BMP type/description	-
biofiltration BMP it serves in discussion section below)	
☐ Flow-thru treatment control with alternative compliance (provide BMP type/description in	
discussion section below)	
$\hfill \square$ Detention pond or vault for hydromodification m	nanagement
$\hfill \Box$ Other (describe in discussion section below)	
Purpose:	
☐ Pollutant control only	
\square Hydromodification control only	
□ Combined pollutant control and hydromodification control	
$\hfill \square$ Pre-treatment/forebay for another structural BM	IP .
☐ Other (describe in discussion section below)	
Who will certify construction of this BMP?	
Provide name and contact information for the	
party responsible to sign BMP verification form DS-563	
D3-303	
Who will be the final owner of this BMP?	
Who will maintain this BMP into perpetuity?	
What is the funding mechanism for	
maintenance?	



Form I-6 Page of (Copy as many as needed)
Structural BMP ID No.
Construction Plan Sheet No.
Discussion (as needed; must include worksheets showing BMP sizing calculations in the SWQMPs):



Form I-6 Page of (Copy as many as needed)	
Structural BMP Summary Information	
Structural BMP ID No.	
Construction Plan Sheet No.	
Type of Structural BMP:	
□ Retention by harvest and use (e.g. HU-1, cistern)	
□ Retention by infiltration basin (INF-1)	
□ Retention by bioretention (INF-2)	
□ Retention by permeable pavement (INF-3)	
Partial retention by biofiltration with partial reter	ntion (PR-1)
☐ Biofiltration (BF-1)	
☐ Flow-thru treatment control with prior lawful approval to meet earlier PDP requirements (provide BMP type/description in discussion section below)	
□ Flow-thru treatment control included as pre-treatment/forebay for an onsite retention or	
biofiltration BMP (provide BMP type/description	-
biofiltration BMP it serves in discussion section below)	
☐ Flow-thru treatment control with alternative compliance (provide BMP type/description in	
discussion section below)	
$\hfill \square$ Detention pond or vault for hydromodification m	nanagement
$\hfill \Box$ Other (describe in discussion section below)	
Purpose:	
☐ Pollutant control only	
\square Hydromodification control only	
□ Combined pollutant control and hydromodification control	
$\hfill \square$ Pre-treatment/forebay for another structural BM	IP .
☐ Other (describe in discussion section below)	
Who will certify construction of this BMP?	
Provide name and contact information for the	
party responsible to sign BMP verification form DS-563	
D3-303	
Who will be the final owner of this BMP?	
Who will maintain this BMP into perpetuity?	
What is the funding mechanism for	
maintenance?	



Form I-6 Page of (Copy as many as needed)
Structural BMP ID No.
Construction Plan Sheet No.
Discussion (as needed; must include worksheets showing BMP sizing calculations in the SWQMPs):



Form I-6 Page of (Copy as many as needed)	
Structural BMP Summary Information	
Structural BMP ID No.	
Construction Plan Sheet No.	
Type of Structural BMP:	
□ Retention by harvest and use (e.g. HU-1, cistern)	
□ Retention by infiltration basin (INF-1)	
□ Retention by bioretention (INF-2)	
□ Retention by permeable pavement (INF-3)	
Partial retention by biofiltration with partial reter	ntion (PR-1)
☐ Biofiltration (BF-1)	
☐ Flow-thru treatment control with prior lawful approval to meet earlier PDP requirements (provide BMP type/description in discussion section below)	
□ Flow-thru treatment control included as pre-treatment/forebay for an onsite retention or	
biofiltration BMP (provide BMP type/description	-
biofiltration BMP it serves in discussion section below)	
☐ Flow-thru treatment control with alternative compliance (provide BMP type/description in	
discussion section below)	
$\hfill \square$ Detention pond or vault for hydromodification m	nanagement
$\hfill \Box$ Other (describe in discussion section below)	
Purpose:	
☐ Pollutant control only	
\square Hydromodification control only	
□ Combined pollutant control and hydromodification control	
$\hfill \square$ Pre-treatment/forebay for another structural BM	IP .
☐ Other (describe in discussion section below)	
Who will certify construction of this BMP?	
Provide name and contact information for the	
party responsible to sign BMP verification form DS-563	
D3-303	
Who will be the final owner of this BMP?	
Who will maintain this BMP into perpetuity?	
What is the funding mechanism for	
maintenance?	



Form I-6 Page of (Copy as many as needed)
Structural BMP ID No.
Construction Plan Sheet No.
Discussion (as needed; must include worksheets showing BMP sizing calculations in the SWQMPs):



Form I-6 Page of (Copy as many as needed)			
Structural BMP Summary Information			
Structural BMP ID No.			
Construction Plan Sheet No.			
Type of Structural BMP:			
$\hfill\square$ Retention by harvest and use (e.g. HU-1, cistern)			
\square Retention by infiltration basin (INF-1)			
□ Retention by bioretention (INF-2)			
□ Retention by permeable pavement (INF-3)			
Partial retention by biofiltration with partial reter	ntion (PR-1)		
☐ Biofiltration (BF-1)			
☐ Flow-thru treatment control with prior lawful app BMP type/description in discussion section below	· · · · · · · · · · · · · · · · · · ·		
☐ Flow-thru treatment control included as pre-trea			
biofiltration BMP (provide BMP type/description	-		
biofiltration BMP it serves in discussion section b			
☐ Flow-thru treatment control with alternative com	ipliance (provide BMP type/description in		
discussion section below)			
$\hfill \square$ Detention pond or vault for hydromodification m	nanagement		
$\hfill \Box$ Other (describe in discussion section below)			
Purpose:			
☐ Pollutant control only			
\square Hydromodification control only			
$\hfill \square$ Combined pollutant control and hydromodificati	on control		
$\hfill \square$ Pre-treatment/forebay for another structural BM	IP .		
☐ Other (describe in discussion section below)			
Who will certify construction of this BMP?			
Provide name and contact information for the			
party responsible to sign BMP verification form DS-563			
D3-303			
Who will be the final owner of this BMP?			
Who will maintain this BMP into perpetuity?			
What is the funding mechanism for			
maintenance?			



Project Name:		
ΓHIS PAGE INTENTIONALLY LEFT	' BLANK FOR DOUBLE-SIDED PRIN	ITING
THIS PAGE INTENTIONALLY LEFT	BLANK FOR DOUBLE-SIDED PRIN	TING
THIS PAGE INTENTIONALLY LEFT	BLANK FOR DOUBLE-SIDED PRIN	TING
THIS PAGE INTENTIONALLY LEFT	BLANK FOR DOUBLE-SIDED PRIN	TING
THIS PAGE INTENTIONALLY LEFT	BLANK FOR DOUBLE-SIDED PRIN	TING
THIS PAGE INTENTIONALLY LEFT	BLANK FOR DOUBLE-SIDED PRIN	TING
THIS PAGE INTENTIONALLY LEFT	BLANK FOR DOUBLE-SIDED PRIN	TING
THIS PAGE INTENTIONALLY LEFT	BLANK FOR DOUBLE-SIDED PRIN	TING
THIS PAGE INTENTIONALLY LEFT	BLANK FOR DOUBLE-SIDED PRIN	TING
THIS PAGE INTENTIONALLY LEFT	BLANK FOR DOUBLE-SIDED PRIN	TING
THIS PAGE INTENTIONALLY LEFT	BLANK FOR DOUBLE-SIDED PRIN	TING
THIS PAGE INTENTIONALLY LEFT	BLANK FOR DOUBLE-SIDED PRIN	TING
THIS PAGE INTENTIONALLY LEFT	BLANK FOR DOUBLE-SIDED PRIN	TING

Attachment 1 Backup For PDP Pollutant Control BMPs

This is the cover sheet for Attachment 1.



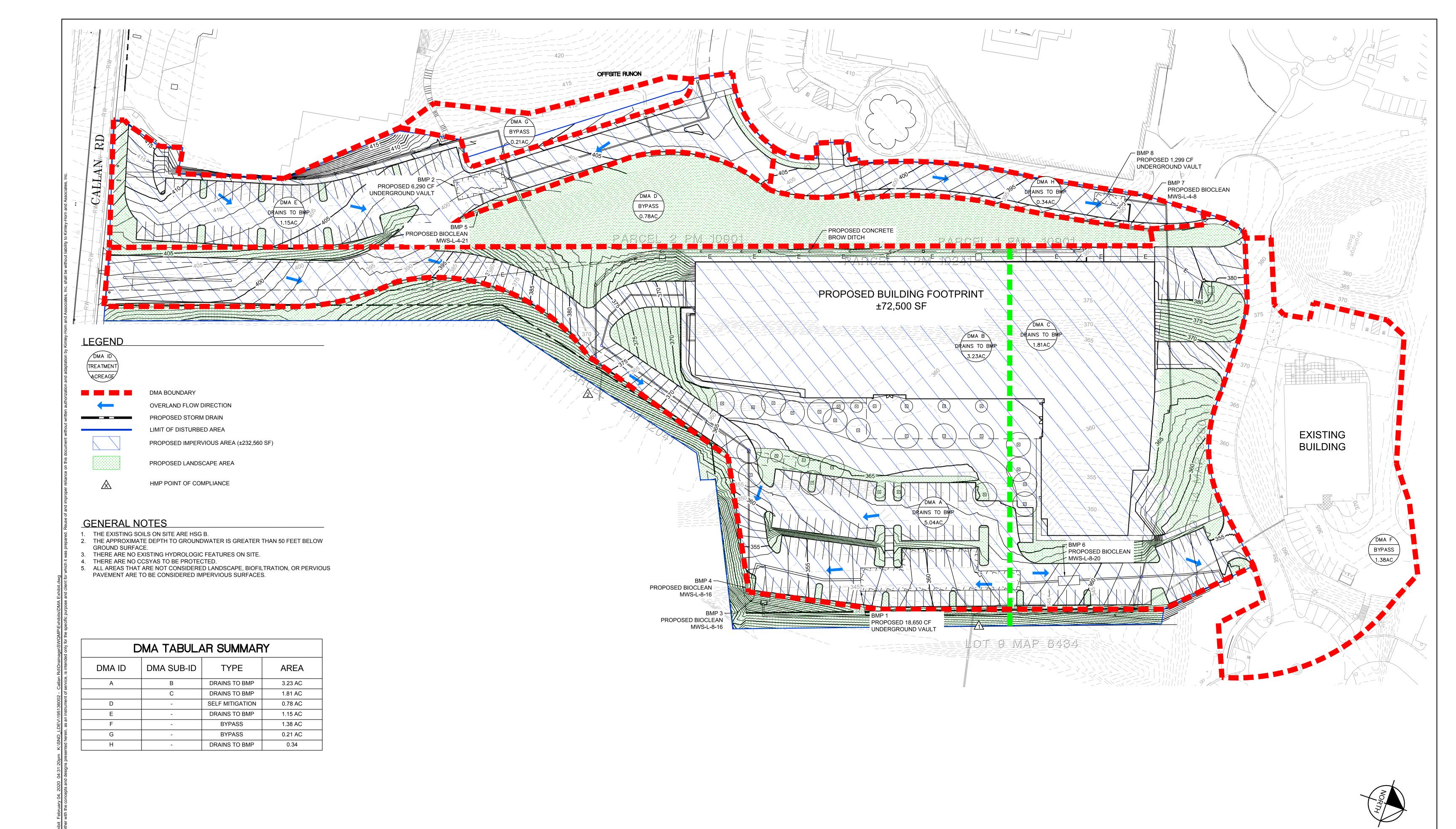
Project Name:			
THIS PAGE INTENTIONALLY	Y LEFT BLANK FOR	DOUBLE-SIDED PI	RINTING

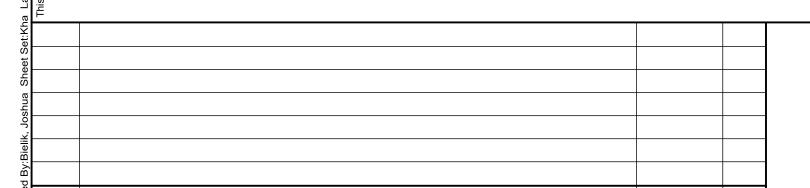
Indicate which Items are Included:

Attachment Sequence	Contents	Checklist		
•	DMA Exhibit (Required) See			
Attachment 1a	DMA Exhibit Checklist.	Included		
Attachment 1b	Tabular Summary of DMAs Showing DMA ID matching DMA Exhibit, DMA Area, and DMA Type (Required)*	Included on DMA Exhibit in Attachment 1a		
	*Provide table in this Attachment OR on DMA Exhibit in Attachment 1a	Included as Attachment 1b, separate from DMA Exhibit		
	Form I-7, Harvest and Use Feasibility Screening Checklist (Required unless the entire project will use infiltration BMPs)	Included Not included because the		
Attachment 1c	Refer to Appendix B.3-1 of the BMP Design Manual to complete Form I-7.	Not included because the entire project will use infiltration BMPs		
	Infiltration Feasibility Information. Contents of Attachment 1d depend on the infiltration condition:			
	 No Infiltration Condition: Infiltration Feasibility Condition Letter (Note: must be stamped and signed by licensed geotechnical engineer) Form I-8A (optional) Form I-8B (optional) 	Included		
Attachment 1d	 Partial Infiltration Condition: Infiltration Feasibility Condition Letter (Note: must be stamped and signed by licensed geotechnical engineer) Form I-8A Form I-8B 	Not included because the entire project will use harvest and use BMPs		
	 Full Infiltration Condition: Form I-8A Form I-8B Worksheet C.4-3 Form I-9 Refer to Appendices C and D of the BMP Design Manual for guidance. 			
Attachment 1e	Pollutant Control BMP Design Worksheets / Calculations (Required)	Included		
	Refer to Appendices B and E of the BMP Design Manual for structural pollutant control BMP design guidelines and site design credit calculations			

Use this checklist to ensure the required information has been included on the DMA Exhibit:

The DMA Exhibit must identify:
Underlying hydrologic soil group
Approximate depth to groundwater
Existing natural hydrologic features (watercourses, seeps, springs, wetlands)
Critical coarse sediment yield areas to be protected
Existing topography and impervious areas
Existing and proposed site drainage network and connections to drainage offsite
Proposed grading
Proposed impervious features
Proposed design features and surface treatments used to minimize
imperviousness
Drainage management area (DMA) boundaries, DMA ID numbers, and DMA
areas (square footage or acreage), and DMA type (i.e., drains to BMP, self-
retaining, or self-mitigating)
Potential pollutant source areas and corresponding required source controls
(see Chapter 4, Appendix E.1, and Form I-3B)
Structural BMPs (identify location, type of BMP, size/detail, and include cross-
section)





DATE BY

REVISIONS



KHA PROJECT		
19	5136002	2
DATE		
2/4/2020		
SCALE	AS SH	IOWN
DESIGNED BY		
DRAWN BY		

CITY OF SAN DIEGO

3020 CALLAN ROAD

PREPARED FOR

HEALTHPEAK

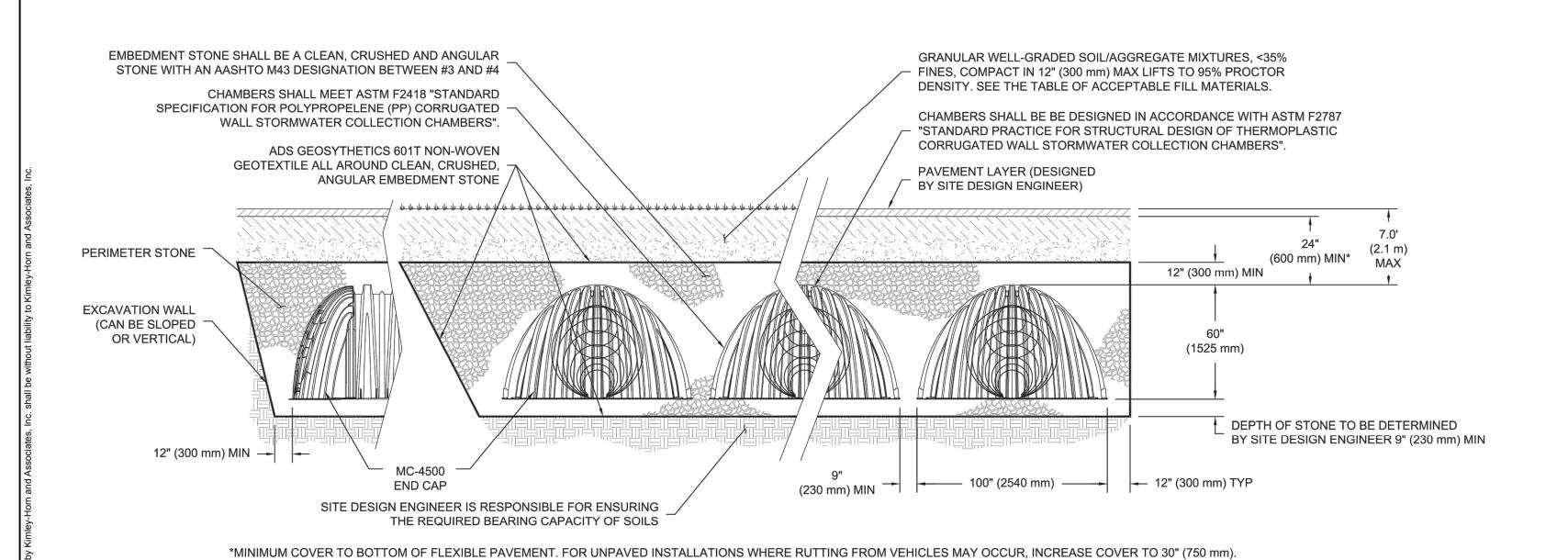
PROPOSED DMA/HMP EXHIBIT

SHEET NUMBER

1

OF

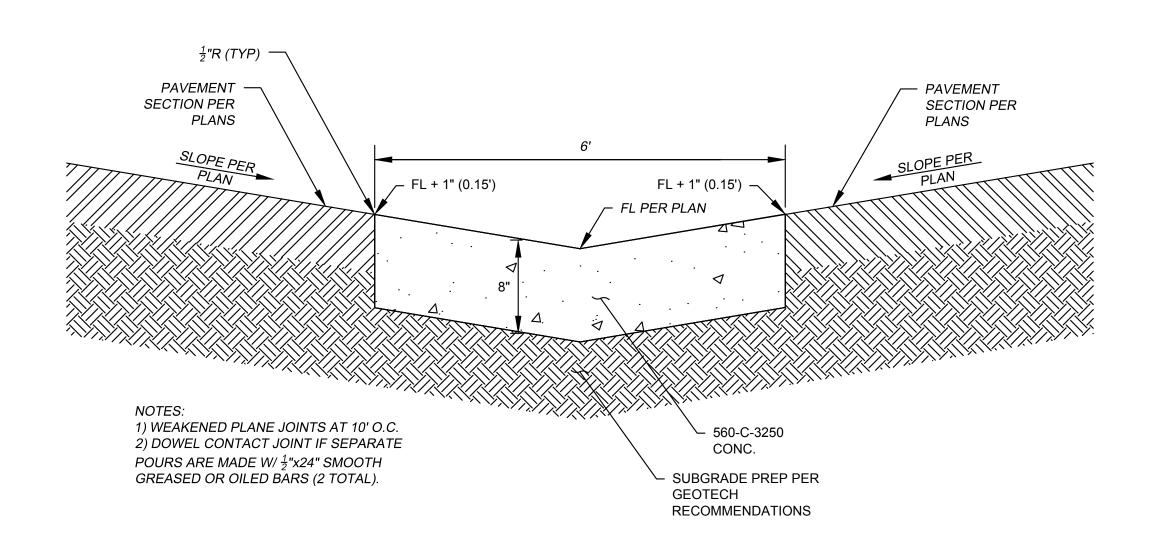
3



UNDERGROUND CISTERN CROSS SECTION

B BROW DITCH

NOT TO SCALE



RIBBON GUTTER

MODIFIED TYPE A4 CATCH BASIN

NOT TO SCALE

CA

No. REVISIONS DATE BY

© 2020 KIMLEY-HORN AND ASSOCIATES, INC. 401 B STREET, SUITE 600; SAN DIEGO, CA 92101 PHONE: 619-234-9411 WWW.KIMLEY-HORN.COM

KHA PROJECT
195136002

DATE
2/4/2020

SCALE AS SHOWN

DESIGNED BY ____

DRAWN BY ____

CHECKED BY

CITY OF SAN DIEGO

3020 CALLAN ROAD

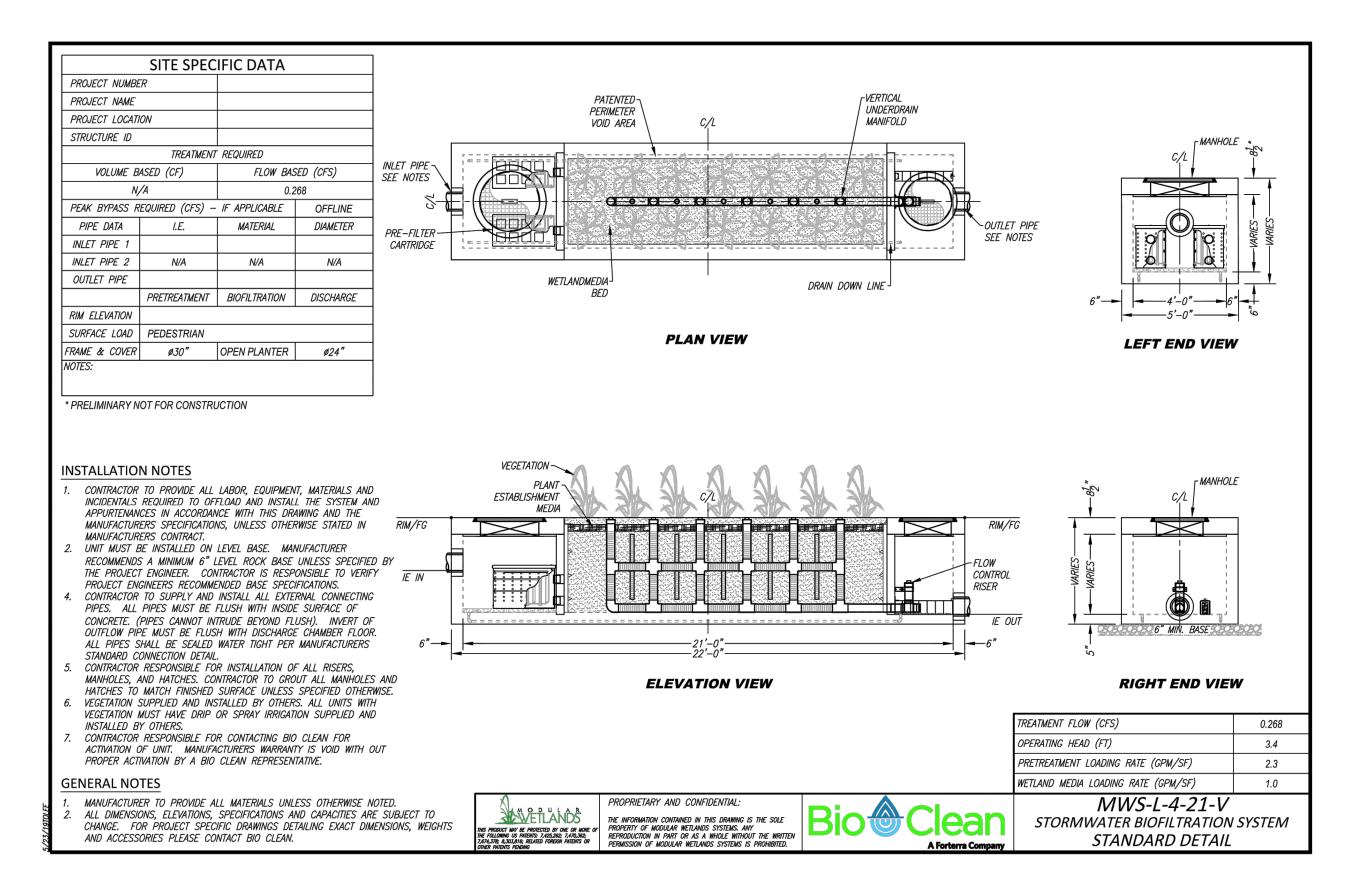
PREPARED FOR

HEALTHPEAK

PROPOSED DMA/HMP EXHIBIT

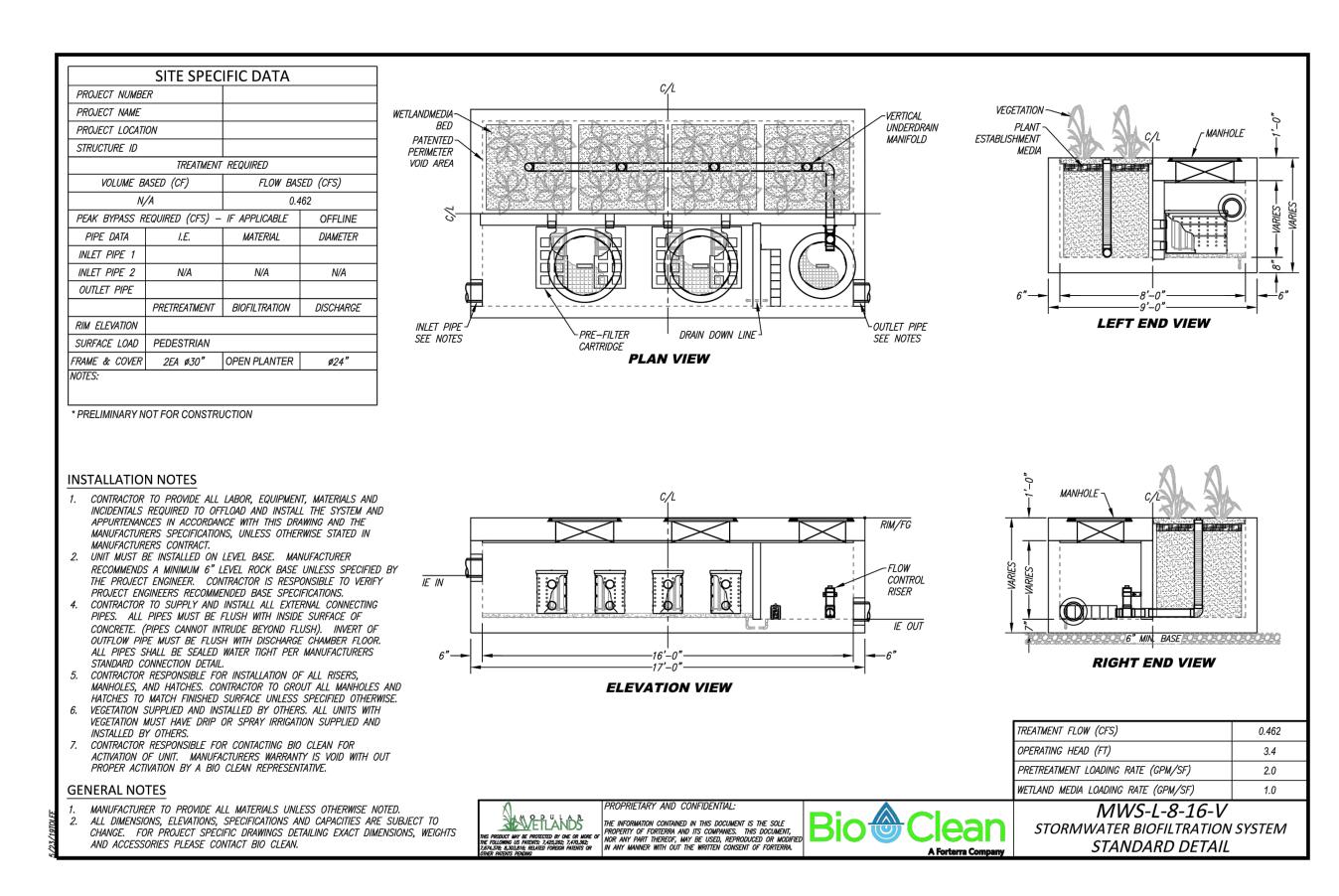
2 OF 3

SHEET NUMBER

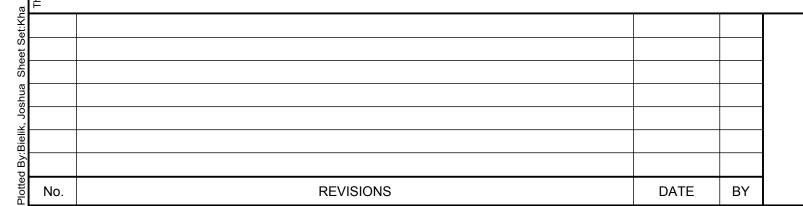


MWS-L-4-21-V STORMWATER BIOFILTRATION SYSTEM STANDARD DETAIL

NOT TO SCALE

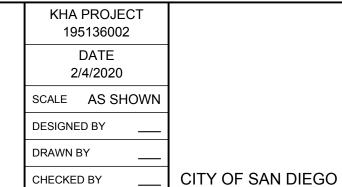


C MWS-L-8-16-V STORMWATER BIOFILTRATION SYSTEM STANDARD DETAIL





WWW.KIMLEY-HORN.COM



3020 CALLAN ROAD

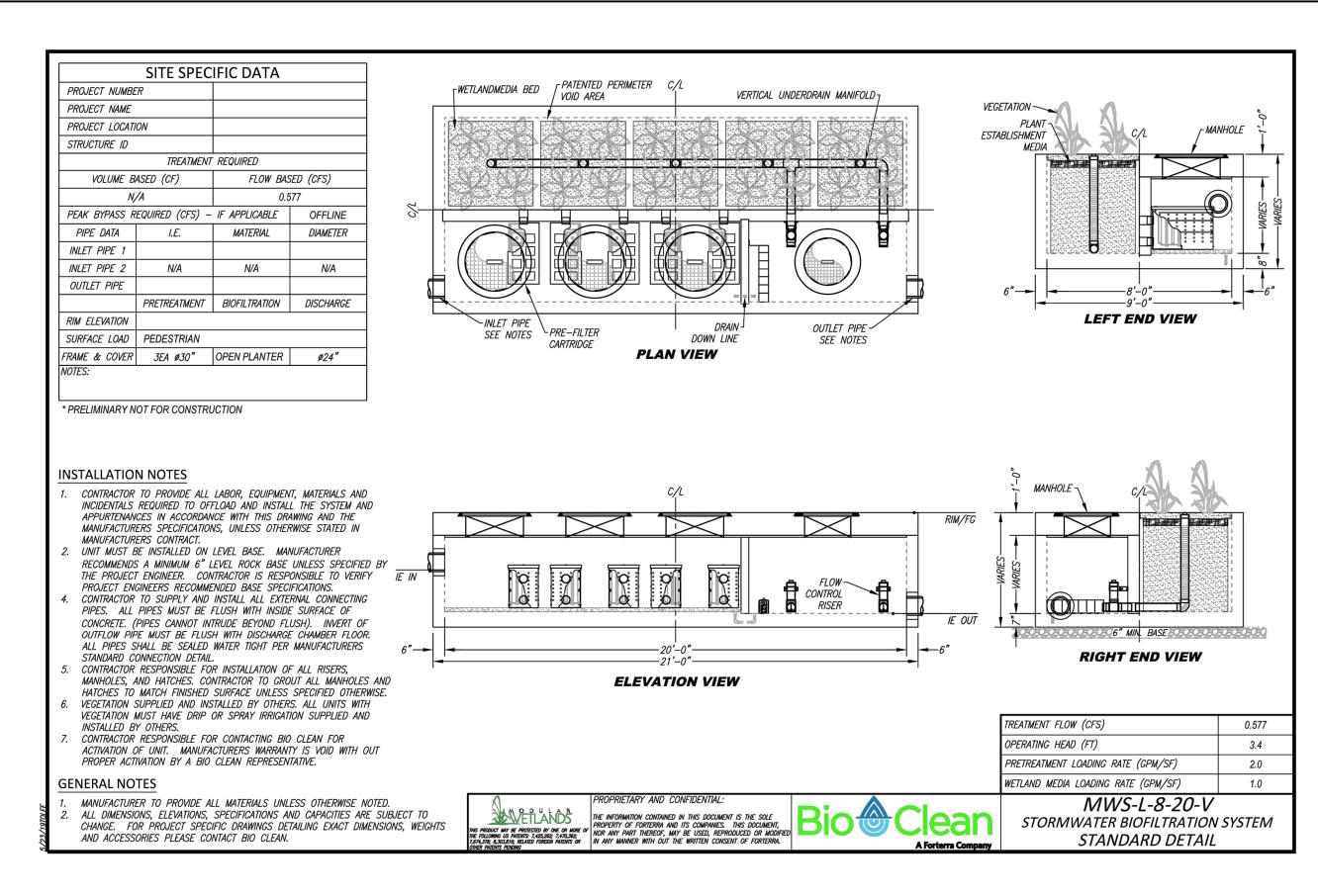
PREPARED FOR

HEALTHPEAK

CA

PROPOSED DMA/HMP EXHIBIT

3 OF 3



B MWS-L-8-20-V STORMWATER BIOFILTRATION SYSTEM STANDARD DETAIL

Harvest and Use Feasibility Checklist Worksheet B.3-1: Form I-7 1. Is there a demand for harvested water (check all that apply) at the project site that is reliably present during the wet season? ☐ Toilet and urinal flushing ☐ Landscape irrigation □ Other:_ 2. If there is a demand; estimate the anticipated average wet season demand over a period of 36 hours. Guidance for planning level demand calculations for toilet/urinal flushing and landscape irrigation is provided in Section B.3.2. [Provide a summary of calculations here] 3. Calculate the DCV using worksheet B-2.1. DCV = (cubic feet) [Provide a summary of calculations here] 3a. Is the 36-hour 3b. Is the 36-hour demand greater 3c. Is the 36hour demand demand greater than or than 0.25DCV but less than the full equal to the DCV? less than DCV? 0.25DCV? Yes No ☐ Yes No Yes Harvest and use appears to Harvest and use may be feasible. Conduct Harvest and be feasible. Conduct more more detailed evaluation and sizing use is detailed evaluation and calculations to determine feasibility. considered to sizing calculations to Harvest and use may only be able to be be infeasible. confirm that DCV can be used for a portion of the site, or used at an adequate rate to (optionally) the storage may need to be meet drawdown criteria. upsized to meet long term capture targets while draining in longer than 36 hours.

Is harvest and use feasible based on further evaluation? Yes, refer to Appendix E to select and size harvest and use BMPs. No, select alternate BMPs.



Categorization of Infiltration Feasibility Condition based on Geotechnical Conditions		Worksheet C.4-1:Form I- 8A ¹⁰		
	Part 1 - Full Infiltration Feasibility Screening Criteria			
DMA(s)Be	eingAnalyzed:	ProjectPhase:		
Callan Road Redevelopment Design				
Criteria 1:	Infiltration Rate Screening			
	Is the mapped hydrologic soil group according to the NRCS Web Soil Survey or UC Davis Soil Web Mapper Type A or B and corroborated by available site soil data ¹¹ ?			
	Yes; the DMA may feasibly support full infiltration. Answer "Yes" to Criteria 1 Result or continue to Step 1B if the applicant elects to perform infiltration testing.			
1.0	No; the mapped soil types are A or B but is not corroborated by available site soil data (continue to Step 1B).			
1A	☐ No; the mapped soil types are C, D, or "urban/unclassified" and is corroborated by available site soil data. Answer "No" to Criteria 1 Result.			
	□ No; the mapped soil types are C, D, or "urban/unclassified" bu soil data (continue to Step 1B).	t is not corroborated by available site		
	Is the reliable infiltration rate calculated using planning phase me	ethods from Table D.3-1?		
1B				
	Is the reliable infiltration rate calculated using planning phase n than 0.5 inches per hour?	nethods from Table D.3-1 greater		
1C	Yes; the DMA may feasibly support full infiltration. Answer "Yes" to Criteria 1 Result.			
No; full infiltration is not required. Answer "No" to Criteria 1 Result. Resul				
	Infiltration Testing Method. Is the selected infiltration testing r phase (see Appendix D.3)? Note: Alternative testing standards n			
1D	rationales and documentation.	,		
	☐ Yes; continue to Step 1E. ☐ No; select an appropriate infiltration testing method.			

Note that it is not required to investigate each and every criterion in the worksheet, a single "no" answer in Part 1, Part 2, Part 3, or Part 4 determines a full, partial, or no infiltration condition.



¹⁰ This form must be completed each time there is a change to the site layout that would affect the infiltration feasibility condition. Previously completed forms shall be retained to document the evolution of the site storm water design.

¹¹ Available data include site-specific sampling or observation of soil types or texture classes, such as obtained from borings or test pits necessary to support other design elements.

Categorizat	tion of Infiltration Feasibility Condition based on Geotechnical Conditions	Worksheet C.4-1:Form I- 8A ¹⁰	
1E	Number of Percolation/Infiltration Tests. Does the infiltration the minimum number of tests specified in Table D.3-2? Yes; continue to Step 1F. No; conduct appropriate number of tests.	on testing method performed satisfy	
IF	Factor of Safety. Is the suitable Factor of Safety selected for full infiltration design? See guidance in D.5; Tables D.5-1 and D.5-2; and Worksheet D.5-1 (Form I-9). Yes; continue to Step 1G. No; select appropriate factor of safety.		
1G	Full Infiltration Feasibility. Is the average measured infiltration greater than 0.5 inches per hour? Yes; answer "Yes" to Criteria 1 Result. No; answer "No" to Criteria 1 Result.	n rate divided by the Factor of Safety	
Criteria 1 Result	Is the estimated reliable infiltration rate greater than 0.5 incrunoff can reasonably be routed to a BMP? Yes; the DMA may feasibly support full infiltration. Contin No; full infiltration is not required. Skip to Part 1 Result.		
Summarize infiltration testing methods, testing locations, replicates, and results and summarize estimates of reliable infiltration rates according to procedures outlined in D.5. Documentation should be included in project geotechnical report.			
We performed two infiltration tests within the underlying Very Old Paralic Deposits and Scripps Formation at the site in areas where less than 5 feet of fill exists. The results indicate an average rate of 0.02 inches per hour (with an applied factor of safety of 2). Therefore, full infiltration is considered infeasible at the site.			



Categorization of Infiltration Feasibility Condition based on Worksheet C.4-1:Form I-**Geotechnical Conditions** 8A¹⁰ Criteria 2: Geologic/Geotechnical Screening If all questions in Step 2A are answered "Yes," continue to Step 2B. For any "No" answer in Step 2A answer "No" to Criteria 2, and submit an "Infiltration Feasibility Condition Letter" that meets the requirements in Appendix C.1.1. The geologic/geotechnical analyses listed in Appendix C.2.1 do not apply to the DMA because one of the following setbacks cannot be 2A avoided and therefore result in the DMA being in a no infiltration condition. The setbacks must be the closest horizontal radial distance from the surface edge (at the overflow elevation) of the BMP. Can the proposed full infiltration BMP(s) avoid areas with existing fill materials greater than 5 feet thick below the infiltrating surface? No 2A-1 Yes Can the proposed full infiltration BMP(s) avoid placement within 10 feet of 2A-2 existing underground utilities, structures, or retaining walls? Yes ☐ No Can the proposed full infiltration BMP(s) avoid placement within 50 feet of a natural slope (>25%) or within a distance of 1.5H from fill slopes where H is the 2A-3 ☐ Yes ☐ No height of the fill slope? When full infiltration is determined to be feasible, a geotechnical investigation report must be prepared that considers the relevant factors identified in Appendix C.2.1. 2B If all questions in Step 2B are answered "Yes," then answer "Yes" to Criteria 2 Result. If there are "No" answers continue to Step 2C. Hydroconsolidation. Analyze hydroconsolidation potential per approved ASTM standard due to a proposed full infiltration BMP. 2B-1 Yes ☐ No Can full infiltration BMPs be proposed within the DMA without increasing hydroconsolidation risks? Expansive Soils. Identify expansive soils (soils with an expansion index greater than 20) and the extent of such soils due to proposed full infiltration BMPs. 2B-2 Can full infiltration BMPs be proposed within the DMA without increasing Yes ☐ No expansive soil risks?



Categorization of Infiltration Feasibility Condition based on Workshed		Workshee	t C.4-1:Fo 8A ¹⁰	rm I-
2B-3	Liquefaction. If applicable, identify mapped liquefaction areas. Exliquefaction hazards in accordance with Section 6.4.2 of the Cit Diego's Guidelines for Geotechnical Reports (2011 or most recliquefaction hazard assessment shall take into account any incomposed infiltration or groundwater mounding that could occord proposed infiltration or percolation facilities. Can full infiltration BMPs be proposed within the DMA without liquefaction risks?	y of San eent edition). crease in cur as a result	☐ Yes	□No
2B-4	Slope Stability. If applicable, perform a slope stability analysis accordance with the ASCE and Southern California Earthquake Recommended Procedures for Implementation of DMG Specia 117, Guidelines for Analyzing and Mitigating Landslide Hazard: to determine minimum slope setbacks for full infiltration BMP of San Diego's Guidelines for Geotechnical Reports (2011) to dwhich type of slope stability analysis is required. Can full infiltration BMPs be proposed within the DMA without slope stability risks?	Center (2002) al Publication s in California s. See the City letermine	☐ Yes	□No
2B-5	Other Geotechnical Hazards. Identify site-specific geotechnical already mentioned (refer to Appendix C.2.1). Can full infiltration BMPs be proposed within the DMA without risk of geologic or geotechnical hazards not already mentioned.	t increasing	☐ Yes	□No
2B-6	Setbacks. Establish setbacks from underground utilities, struct retaining walls. Reference applicable ASTM or other recognized the geotechnical report. Can full infiltration BMPs be proposed within the DMA using esta setbacks from underground utilities, structures, and/or retaining	standard in	☐ Yes	□ No



Categoriz	cation of Infiltration Feasibility Condition based on Geotechnical Conditions	Workshee	t C.4-1:Fo 8A ¹⁰	rm I-
2 C	Mitigation Measures. Propose mitigation measures for each geologic/geotechnical hazard identified in Step 2B. Provide a disc geologic/geotechnical hazards that would prevent full infiltration cannot be reasonably mitigated in the geotechnical report. See A C.2.1.8 for a list of typically reasonable and typically unreasonable measures. Can mitigation measures be proposed to allow for full infiltration the question in Step 2 is answered "Yes," then answer "Yes" to Result. If the question in Step 2C is answered "No," then answer "No" Criteria 2Result.	n BMPs that appendix le mitigation ion BMPs? If o Criteria 2	☐ Yes	□ No
Criteria 2 Result	Can infiltration greater than 0.5 inches per hour be allowed w increasing risk of geologic or geotechnical hazards that cannot reasonably mitigated to an acceptable level?		☐ Yes	□No
Summarize findings and basis; provide references to related reports or exhibits.				
We performed two infiltration tests within the underlying Very Old Paralic Deposits and Scripps Formation at the site. The results indicate an average rate of 0.02 inches per hour (with an applied factor of safety of 2). Therefore, infiltration is considered infeasible at the site.				
	art 1 Result – Full Infiltration Geotechnical Screening 12		Result	
design is p	to both Criteria 1 and Criteria 2 are "Yes", a full infiltration potentially feasible based on Geotechnical conditions only. Inswer to Criteria 1 or Criteria 2 is "No", a full infiltration ot required.		filtration Co	

 $^{^{12}}$ To be completed using gathered site information and best professional judgement considering the definition of MEP in the MS4 Permit. Additional testing and/or studies may be required by City Engineer to substantiate findings.



Categoriz	zation of Infiltration Feasibility Condition based on Geotechnical Conditions	Worksheet C.4-1:Form I- 8A ¹⁰	
	Part 2 – Partial vs. No Infiltration Feasibility Screening	g Criteria	
DMA(s)Be	eing Analyzed:	ProjectPhase:	
Callan Road	l Redevelopment	Design	
Criteria 3:	Infiltration Rate Screening		
	NRCS Type C, D, or "urban/unclassified": Is the mapped hydro NRCS Web Soil Survey or UC Davis Soil Web Mapper is Type C, corroborated by available site soil data?		
3A	☐ Yes; the site is mapped as C soils and a reliable infiltration ra infiltration BMPS. Answer "Yes" to Criteria 3 Result.	te of 0.15 in/hr. is used to size partial	
	☐ Yes; the site is mapped as D soils or "urban/unclassified" ar in/hr. is used to size partial infiltration BMPS. Answer "Yes" t		
	No; infiltration testing is conducted (refer to Table D.3−1), conducted (ontinue to Step 3B.	
	Infiltration Testing Result: Is the reliable infiltration rate (i.e. as greater than 0.05 in/hr. and less than or equal to 0.5 in/hr?	verage measured infiltration rate/2)	
3B	\square Yes; the site may support partial infiltration. Answer "Yes" to		
	☑ No; the reliable infiltration rate (i.e. average measured rate/infiltration is not required. Answer "No" to Criteria 3 Result.	'2) is less than 0.05 in/hr., partial	
Criteria 3	Is the estimated reliable infiltration rate (i.e., average measure equal to 0.05 inches/hour and less than or equal to 0.5 inches DMA where runoff can reasonably be routed to a BMP?	· -	
Result	☐ Yes; Continue to Criteria 4.		
	☑ No: Skip to Part 2 Result.		
Summarize rate).	infiltration testing and/or mapping results (i.e. soil maps and ser	ies description used for infiltration	
We performed two infiltration tests within the underlying Very Old Paralic Deposits and Scripps Formation at the site in areas where less than 5 feet of fill exists. The results indicate an average rate of 0.02 inches per hour (with an applied factor of safety of 2). Therefore, partial infiltration is considered infeasible at the site.			



Categori	zation of Infiltration Feasibility Condition based on Geotechnical Conditions	Worksh	eet C.4-1:F	orm I-
Criteria 4:	Geologic/Geotechnical Screening			
4A	If all questions in Step 4A are answered "Yes," continue to Step For any "No" answer in Step 4A answer "No" to Criteria 4 Result, Condition Letter" that meets the requirements in Appendix C.1.1 listed in Appendix C.2.1 do not apply to the DMA because one of avoided and therefore result in the DMA being in a no infiltration closest horizontal radial distance from the surface edge (at the or	and submit ar . The geologic the following condition. Th	/geotechnica setbacks can e setbacks m	l analyses not be ust be the
4A-1	Can the proposed partial infiltration BMP(s) avoid areas with existing materials greater than 5 feet thick?	ng fill	☐ Yes	□ No
4A-2	Can the proposed partial infiltration BMP(s) avoid placement with 10 feet of existing underground utilities, structures, or retaining v		☐ Yes	□No
4A-3	Can the proposed partial infiltration BMP(s) avoid placement with a natural slope (>25%) or within a distance of 1.5H from fill slopes the height of the fill slope?		☐ Yes	□No
4B	When full infiltration is determined to be feasible, a geotechnical in that considers the relevant factors identified in Appendix C.2.1 If all questions in Step 4B are answered "Yes," then answer "Yes" "No" answers continue to Step 4C.	-		
4B-1	Hydroconsolidation. Analyze hydroconsolidation potential per ap ASTM standard due to a proposed full infiltration BMP. Can partial infiltration BMPs be proposed within the DMA withou hydroconsolidation risks?		☐ Yes	□No
4B-2	Expansive Soils. Identify expansive soils (soils with an expansion greater than 20) and the extent of such soils due to proposed infiltration BMPs. Can partial infiltration BMPs be proposed within the DMA with increasing expansive soil risks?	full	☐ Yes	□ No



Categorization of Infiltration Feasibility Condition based on Workshee Geotechnical Conditions			eet C.4-1:F 8A ¹⁰	et C.4-1:Form I- 8A ¹⁰	
4B-3	Liquefaction. If applicable, identify mapped liquefaction areas liquefaction hazards in accordance with Section 6.4.2 of the Cir Diego's Guidelines for Geotechnical Reports (2011). Liquefacti assessment shall take into account any increase in groundwate or groundwater mounding that could occur as a result of proposinfiltration or percolation facilities. Can partial infiltration BMPs be proposed within the DMA with increasing liquefaction risks?	ty of San on hazard er elevation sed	☐ Yes	□No	
4B-4	Slope Stability. If applicable, perform a slope stability analysis accordance with the ASCE and Southern California Earthquake Ce Recommended Procedures for Implementation of DMG Special 117, Guidelines for Analyzing and Mitigating Landslide Hazard California to determine minimum slope setbacks for full infiltr See the City of San Diego's Guidelines for Geotechnical Report determine which type of slope stability analysis is required. Can partial infiltration BMPs be proposed within the DMA with increasing slope stability risks?	enter (2002) Publication s in ation BMPs. s (2011) to	☐ Yes	□No	
4B-5	Other Geotechnical Hazards. Identify site-specific geotechnical not already mentioned (refer to Appendix C.2.1). Can partial infiltration BMPs be proposed within the DMA with increasing risk of geologic or geotechnical hazards not already mentioned?	hout	☐ Yes	□No	
4B-6	Setbacks. Establish setbacks from underground utilities, struct and/or retaining walls. Reference applicable ASTM or other restandard in the geotechnical report. Can partial infiltration BMPs be proposed within the DMA using recommended setbacks from underground utilities, structures, a retaining walls?	cognized	☐ Yes	□No	
4C	Mitigation Measures. Propose mitigation measures for each geologic/geotechnical hazard identified in Step 4B. Provide a disc geologic/geotechnical hazards that would prevent partial infiltration that cannot be reasonably mitigated in the geotechnical report. Suppendix C.2.1.8 for a list of typically reasonable and typically unmitigation measures. Can mitigation measures be proposed to allow for partial infiltrations. BMPs? If the question in Step 4C is answered "Yes," then answer that the question in Step 4C is answered "No," then answer "No," the no, "No," the no, "No, "No, "No, "No, "No, "No, "No, "N	tion BMPs See Ireasonable ation ver "Yes" to	☐ Yes	□No	



Categorization of Infiltration Feasibility Condition based on Worksh Geotechnical Conditions		eet C.4-1:Form 8A ¹⁰	1 I -	
Criteria 4 Result	Can infiltration of greater than or equal to 0.05 inches/hour at than or equal to 0.5 inches/hour be allowed without increas of geologic or geotechnical hazards that cannot be reasonab mitigated to an acceptable level?	ng the risk		
Summarize fir	ndings and basis; provide references to related reports or exhib	its.		
	Part 2 – Partial Infiltration Geotechnical Screening Result ¹³		Result	
	ooth Criteria 3 and Criteria 4 are "Yes", a partial infiltration de asible based on geotechnical conditions only.	sign is	☐ Partial Infiltr Condition	
	either Criteria 3 or Criteria 4 is "No", then infiltration of a to be infeasible within the site.	iny volume	⊠ No Infiltrat Condition	



¹³ To be completed using gathered site information and best professional judgement considering the definition of MEP in the MS4 Permit. Additional testing and/or studies may be required by City Engineer to substantiate findings

DMA A

Design Capture Volume		Wor	ksheet	sheet B.2-1	
1	85 th percentile 24-hr storm depth from Figure B.1-1	d=		inches	
2	Area tributary to BMP (s)	A=		acres	
3	Area weighted runoff factor (estimate using Appendix B.1.1 and B.2.1)	C=		unitless	
4	Trees Credit Volume Note: In the SWQMP list the number of trees, size of each tree, amount of soil volume installed for each tree, contributing area to each tree and the inlet opening dimension for each tree.	TCV=		cubic-feet	
5	Rain barrels Credit Volume Note: In the SWQMP list the number of rain barrels, size of each rain barrel and the use of the captured storm water runoff.	RCV=		cubic-feet	
6	Calculate DCV = (3630 x C x d x A) – TCV – RCV	DCV=		cubic-feet	



DMA E

Design Capture Volume		Wor	ksheet	eet B.2-1	
1	85 th percentile 24-hr storm depth from Figure B.1-1	d=		inches	
2	Area tributary to BMP (s)	A=		acres	
3	Area weighted runoff factor (estimate using Appendix B.1.1 and B.2.1)	C=		unitless	
4	Trees Credit Volume Note: In the SWQMP list the number of trees, size of each tree, amount of soil volume installed for each tree, contributing area to each tree and the inlet opening dimension for each tree.	TCV=		cubic-feet	
5	Rain barrels Credit Volume Note: In the SWQMP list the number of rain barrels, size of each rain barrel and the use of the captured storm water runoff.	RCV=		cubic-feet	
6	Calculate DCV = (3630 x C x d x A) – TCV – RCV	DCV=		cubic-feet	



DMA H

Design Capture Volume		Wor	ksheet B.2-1	
1	85 th percentile 24-hr storm depth from Figure B.1-1	d=		inches
2	Area tributary to BMP (s)	A=		acres
3	Area weighted runoff factor (estimate using Appendix B.1.1 and B.2.1)	C=		unitless
4	Trees Credit Volume Note: In the SWQMP list the number of trees, size of each tree, amount of soil volume installed for each tree, contributing area to each tree and the inlet opening dimension for each tree.	TCV=		cubic-feet
5	Rain barrels Credit Volume Note: In the SWQMP list the number of rain barrels, size of each rain barrel and the use of the captured storm water runoff.	RCV=		cubic-feet
6	Calculate DCV = (3630 x C x d x A) – TCV – RCV	DCV=		cubic-feet



The Ci	ity of	Project Name	Healthpe	eak Callan Rd		
SAN DIEGO Project Name BMP ID				1 (DMA A)		
1 /	Sizing Method for Volume R Area draining to the BMP	etention Criteria	Works	sheet B.5-2	og ft	
	Adjusted runoff factor for drainage are	ea (Refer to Appendix B 1 and B	. 2)	219,542 0.85	sq. ft.	
	85 th percentile 24-hour rainfall depth		·,	0.49	inches	
	Design capture volume [Line 1 x Line	2 x (Line 3/12)]		7620	cu. ft.	
	Retention Requirement					
5 T	Measured infiltration rate in the DMA Note: When mapped hydrologic soil groups Type C soils enter 0.30 When in no infiltration condition and the there are geotechnical and/or ground	he actual measured infiltration r	ate is unknown enter 0.0 if	0	in/hr.	
6 F	Factor of safety			2		
7 F	Reliable infiltration rate, for biofiltration	n BMP sizing [Line 5 / Line 6]		0	in/hr.	
8	Average annual volume reduction tan When Line $7 > 0.01$ in/hr. = Minimum When Line $7 \le 0.01$ in/hr. = 3.5%	,		3.5	%	
9 (Fraction of DCV to be retained (Figur When Line $8 > 8\% =$ 0.0000013 x Line 8^3 - 0.000057 x Line When Line $8 \le 8\% = 0.023$	·		0.023		
10	Target volume retention [Line 9 x Line	e 4]		175	cu. ft.	

2/4/2020 Version 1.0 - June 2017

The C	City of	Project Name	Healthpo	eak Callan Rd	
SAN DIEGO		BMP ID			
4	Sizing Method for Volume R	etention Criteria	Works	sheet B.5-2	,,
	Area draining to the BMP			50094	sq. ft.
2	Adjusted runoff factor for drainage are	ea (Refer to Appendix B.1 and B	.2)	0.85	
3	85 th percentile 24-hour rainfall depth			0.49	inches
4	Design capture volume [Line 1 x Line	2 x (Line 3/12)]		1739	cu. ft.
olume	Retention Requirement				
5	Measured infiltration rate in the DMA Note: When mapped hydrologic soil groups are used enter 0.10 for NRCS Type D soils and for NRCS Type C soils enter 0.30 When in no infiltration condition and the actual measured infiltration rate is unknown enter 0.0 if there are geotechnical and/or groundwater hazards identified in Appendix C or enter 0.05				in/hr.
6	Factor of safety			2	
7	Reliable infiltration rate, for biofiltration	n BMP sizing [Line 5 / Line 6]		0	in/hr.
8	Average annual volume reduction tan When Line $7 > 0.01$ in/hr. = Minimum When Line $7 \le 0.01$ in/hr. = 3.5%	3.5	%		
9	Fraction of DCV to be retained (Figure When Line $8 > 8\% = 0.0000013 \text{ x Line } 8^3 - 0.000057 \text{ x Line}$ When Line $8 \le 8\% = 0.023$	0.023			
10	Target volume retention [Line 9 x Line	e 4]		40	cu. ft.

2/4/2020 Version 1.0 - June 2017

SAN DIEGO		Project Name Hea		hpeak Callan Rd		
		BMP ID	8 (DMA H)			
Sizing M	ethod for Volume R	etention Criteria	Worksheet B.5-2			
1 Area draining	to the BMP		14810	sq. ft.		
2 Adjusted runo	f factor for drainage ar	ea (Refer to Appendix B.1 and B.2)	0.85			
3 85 th percentile	24-hour rainfall depth		0.49	inches		
4 Design capture	e volume [Line 1 x Line	2 x (Line 3/12)]	514	cu. ft.		
olume Retention Re	quirement		-	<u>'</u>		
5 Type C soils e When in no in there are geot	When mapped hydrologic soil groups are used enter 0.10 for NRCS Type D soils and for NRCS					
6 Factor of safet	у		2			
7 Reliable infiltra	ation rate, for biofiltration	n BMP sizing [Line 5 / Line 6]	0	in/hr.		
8 When Line 7 >	al volume reduction tar · 0.01 in/hr. = Minimum · 0.01 in/hr. = 3.5%	3.5	%			
9 When Line 8 > 0.0000013 x L	Fraction of DCV to be retained (Figure B.5-3) When Line $8 > 8\% = 0.0000013 \text{ x Line } 8^3 - 0.000057 \text{ x Line } 8^2 + 0.0086 \text{ x Line } 8 - 0.014$ When Line $8 \le 8\% = 0.023$					
10 Target volume	retention [Line 9 x Line	e 4]	12	cu. ft.		

2/4/2020 Version 1.0 - June 2017

DMA A

	Flow-thru Design Flows	Worksheet B.6-1		
1	DCV	DCV		cubic-feet
2	DCV retained	$\mathrm{DCV}_{\mathrm{retained}}$		cubic-feet
3	DCV biofiltered	DCV _{biofiltered}		cubic-feet
4	DCV requiring flow-thru (Line 1 – Line 2 – 0.67*Line 3)	DCV _{flow-thru}		cubic-feet
5	Adjustment factor (Line 4 / Line 1)	AF=		unitless
6	Design rainfall intensity	i=	0.20	in/hr.
7	Area tributary to BMP (s)	A=		acres
8	Area-weighted runoff factor (estimate using Appendix B.2)	C=		unitless
9	Calculate Flow Rate = AF x (C x i x A)	Q=		cfs

- 1. Adjustment factor shall be estimated considering only retention and biofiltration BMPs located upstream of flow-thru BMPs. That is, if the flow-thru BMP is upstream of the project's retention and biofiltration BMPs then the flow-thru BMP shall be sized using an adjustment factor of 1.
- 2. Volume based (e.g., dry extended detention basin) flow-thru treatment control BMPs shall be sized to the volume in Line 4 and flow based (e.g., vegetated swales) shall be sized to flow rate in Line 9. Sand filter and media filter can be designed either by volume in Line 4 or flow rate in Line 9.
- 3. Proprietary BMPs, if used, shall provide certified treatment capacity equal to or greater than the calculated flow rate in Line 9; certified treatment capacity per unit shall be consistent with third party certifications.

SECTION F.2.2 SIZING OF FLOW BASED COMPACT BIOFILTRATION BMP

Q = 1.5 X Q(B..6-1) Q = 1.5 X 0.889cfs

= 1.33cfs



DMA E

	Flow-thru Design Flows	Worksheet B.6-1		
1	DCV	DCV		cubic-feet
2	DCV retained	$\mathrm{DCV}_{\mathrm{retained}}$		cubic-feet
3	DCV biofiltered	DCV _{biofiltered}		cubic-feet
4	DCV requiring flow-thru (Line 1 – Line 2 – 0.67*Line 3)	DCV _{flow-thru}		cubic-feet
5	Adjustment factor (Line 4 / Line 1)	AF=		unitless
6	Design rainfall intensity	i=	0.20	in/hr.
7	Area tributary to BMP (s)	A=		acres
8	Area-weighted runoff factor (estimate using Appendix B.2)	C=		unitless
9	Calculate Flow Rate = AF x (C x i x A)	Q=		cfs

- 1. Adjustment factor shall be estimated considering only retention and biofiltration BMPs located upstream of flow-thru BMPs. That is, if the flow-thru BMP is upstream of the project's retention and biofiltration BMPs then the flow-thru BMP shall be sized using an adjustment factor of 1.
- 2. Volume based (e.g., dry extended detention basin) flow-thru treatment control BMPs shall be sized to the volume in Line 4 and flow based (e.g., vegetated swales) shall be sized to flow rate in Line 9. Sand filter and media filter can be designed either by volume in Line 4 or flow rate in Line 9.
- 3. Proprietary BMPs, if used, shall provide certified treatment capacity equal to or greater than the calculated flow rate in Line 9; certified treatment capacity per unit shall be consistent with third party certifications.

SECTION F.2.2 SIZING OF FLOW BASED COMPACT BIOFILTRATION BMP

Q = 1.5 X Q(B..6-1) Q = 1.5 X 0.203cfs = 0.304 cfs



DMA H

	Flow-thru Design Flows	Worksheet B.6-1		
1	DCV	DCV		cubic-feet
2	DCV retained	$\mathrm{DCV}_{\mathrm{retained}}$		cubic-feet
3	DCV biofiltered	DCV _{biofiltered}		cubic-feet
4	DCV requiring flow-thru (Line 1 – Line 2 – 0.67*Line 3)	DCV _{flow-thru}		cubic-feet
5	Adjustment factor (Line 4 / Line 1)	AF=		unitless
6	Design rainfall intensity	i=	0.20	in/hr.
7	Area tributary to BMP (s)	A=		acres
8	Area-weighted runoff factor (estimate using Appendix B.2)	C=		unitless
9	Calculate Flow Rate = AF x (C x i x A)	Q=		cfs

- 1. Adjustment factor shall be estimated considering only retention and biofiltration BMPs located upstream of flow-thru BMPs. That is, if the flow-thru BMP is upstream of the project's retention and biofiltration BMPs then the flow-thru BMP shall be sized using an adjustment factor of 1.
- 2. Volume based (e.g., dry extended detention basin) flow-thru treatment control BMPs shall be sized to the volume in Line 4 and flow based (e.g., vegetated swales) shall be sized to flow rate in Line 9. Sand filter and media filter can be designed either by volume in Line 4 or flow rate in Line 9.
- 3. Proprietary BMPs, if used, shall provide certified treatment capacity equal to or greater than the calculated flow rate in Line 9; certified treatment capacity per unit shall be consistent with third party certifications.

SECTION F.2.2 SIZING OF FLOW BASED COMPACT BIOFILTRATION BMP

Q = 1.5 X Q(B..6-1) Q = 1.5 X 0.06cfs = 0.09 cfs



Compact (high rate) Biofiltration BMP Checklist

Form I-10

Compact (high rate) biofiltration BMPs have a media filtration rate greater than 5 in/hr. and a media surface area smaller than 3% of contributing area times adjusted runoff factor. Compact biofiltration BMPs are typically proprietary BMPs that may qualify as biofiltration.

A compact biofiltration BMP may satisfy the pollutant control requirements for a DMA onsite in some cases. This depends on the characteristics of the DMA <u>and</u> the performance certification/data of the BMP. If the pollutant control requirements for a DMA are met onsite, then the DMA is not required to participate in an offsite storm water alternative compliance program to meet its pollutant control obligations.

An applicant using a compact biofiltration BMP to meet the pollutant control requirements onsite must complete Section 1 of this form and include it in the PDP SWQMP. A separate form must be completed for each DMA. In instances where the City Engineer does not agree with the applicant's determination, Section 2 of this form will be completed by the City and returned to the applicant.

Section 1: Biofiltration Criteria Checklist (Appendix F)

Refer to Part 1 of the Storm Water Standards to complete this section. When separate forms/worksheets are referenced below, the applicant must also complete these separate forms/worksheets (as applicable) and include in the PDP SWQMP. The criteria numbers below correspond to the criteria numbers in Appendix F.

Criteria	Answer		Progression
Criteria 1 and 3: What is the infiltration condition of	0	Full Infiltration Condition	Stop . Compact biofiltration BMP is not allowed.
the DMA? Refer to Section 5.4.2 and Appendix C of the BMP Design Manual (Part 1 of Storm Water Standards) for guidance.	O Partial Infiltration		Compact biofiltration BMP is only allowed, if the target volume retention is met onsite (Refer to Table B.5-1 in Appendix B.5). Use Worksheet B.5-2 in Appendix B.5 to estimate the target volume retention (Note: retention in this context means reduction).
Applicant must complete and include the following in the PDP SWQMP submittal to support the feasibility determination:		Condition	If the required volume reduction is achieved proceed to Criteria 2. If the required volume reduction is not achieved, compact biofiltration BMP is not allowed. Stop.
 Infiltration Feasibility Condition Letter; or Worksheet C.4-1: Form I-8A and Worksheet C.4-2: Form I-8B. Applicant must complete and include all applicable sizing worksheets in the SWQMP submittal 	0	No Infiltration Condition	Compact biofiltration BMP is allowed if volume retention criteria in Table B.5-1 in Appendix B.5 for the no infiltration condition is met. Compliance with this criterion must be documented in the PDP SWQMP. If the criteria in Table B.5-1 is met proceed to Criteria 2. If the criteria in Table B.5-1 is not met, compact biofiltration BMP is not allowed. Stop.



Provide basis for Criteria 1 and 3:

Feasibility Analysis:

Summarize findings and include either infiltration feasibility condition letter or Worksheet C.4-1: Form I-8A and Worksheet C.4-2: Form I-8B in the PDP SWQMP submittal.

If Partial Infiltration Condition:

Provide documentation that target volume retention is met (include Worksheet B.5-2 in the PDP SWQMP submittal). Worksheet B.5-7 in Appendix B.5 can be used to estimate volume retention benefits from landscape areas.

If No Infiltration Condition:

Provide documentation that the volume retention performance standard is met (include Worksheet B.5-2 in the PDP SWQMP submittal) in the PDP SWQMP submittal. Worksheet B.5-6 in Appendix B.5 can be used to document that the performance standard is met.

Criteria	Answer	Progression
Criteria 2: Is the compact biofiltration BMP sized to meet the performance standard from the MS4 Permit? Refer to Appendix B.5 and Appendix F.2 of the BMP Design Manual (Part 1 of Storm Water Standards) for guidance.	• Meets Flow based Criteria	Use guidance from Appendix F.2.2 to size the compact biofiltration BMP to meet the flow based criteria. Include the calculations in the PDP SWQMP. Use parameters for sizing consistent with manufacturer guidelines and conditions of its third party certifications (i.e. a BMP certified at a loading rate of 1 gpm/sq. ft. cannot be designed using a loading rate of 1.5 gpm/sq. ft.) Proceed to Criteria 4.
	Meets Volume based Criteria	Provide documentation that the compact biofiltration BMP has a total static (i.e. non-routed) storage volume, including pore-spaces and pre-filter detention volume (Refer to Appendix B.5 for a schematic) of at least 0.75 times the portion of the DCV not reliably retained onsite. Proceed to Criteria 4.
	O Does not Meet either criteria	Stop . Compact biofiltration BMP is not allowed.



Provide basis for Criteria 2:

Provide documentation that the BMP meets the numeric criteria and is designed consistent with the manufacturer guidelines and conditions of its third-party certification (i.e., loading rate, etc., as applicable).

Criteria		Answer	Progression
Criteria 4: Does the compact biofiltration BMP meet the pollutant treatment performance standard for the		Yes, meets the TAPE certification.	Provide documentation that the compact BMP has an appropriate TAPE certification for the projects most significant pollutants of concern. Proceed to Criteria 5.
projects most significant pollutants of concern? Refer to Appendix B.6 and Appendix F.1 of the BMP Design Manual (Part 1 of Storm Water Standards) for guidance.	0	Yes, through other third-party documentation	Acceptance of third-party documentation is at the discretion of the City Engineer. The City engineer will consider, (a) the data submitted; (b) representativeness of the data submitted; and (c) consistency of the BMP performance claims with pollutant control objectives in Table F.1-2 and Table F.1-1 while making this determination. If a compact biofiltration BMP is not accepted, a written explanation/ reason will be provided in Section 2. Proceed to Criteria 5.
	0	No	Stop . Compact biofiltration BMP is not allowed.

Provide basis for Criteria 4:

Provide documentation that identifies the projects most significant pollutants of concern and TAPE certification or other third party documentation that shows that the compact biofiltration BMP meets the pollutant treatment performance standard for the projects most significant pollutants of concern.



Compact (high rate)	Form I-10			
Criteria	Answer	Progression		
Criteria 5: Is the compact biofiltration BMP designed to promote appropriate biological activity to support and maintain treatment process?	• Yes	Provide documentation that the compact biofiltration BMP support appropriate biologica activity. Refer to Appendix F for guidance. Proceed to Criteria 6.		
Refer to Appendix F of the BMP Design Manual (Part 1 of Storm Water Standards) for guidance.	O No	Stop . Compact biofil	tration BMP is not a ll owed.	

Provide basis for Criteria 5:

Provide documentation that appropriate biological activity is supported by the compact biofiltration BMP to maintain treatment process.

Criteria	Answer	Progression
Criteria 6: Is the compact biofiltration BMP designed with a hydraulic loading rate to prevent erosion, scour and channeling within the BMP?	• Yes	Provide documentation that the compact biofiltration BMP is used in a manner consistent with manufacturer guidelines and conditions of its third-party certification. Proceed to Criteria 7.
	O No	Stop . Compact biofiltration BMP is not allowed.

Provide basis for Criteria 6:

Provide documentation that the BMP meets the numeric criteria and is designed consistent with the manufacturer guidelines and conditions of its third-party certification (i.e., maximum tributary area, maximum inflow velocities, etc., as applicable).



Compact (high rate)	Biof	filtration BMP	Checklist	Form I-10	
Criteria		Answer	Progression		
Criteria 7: Is the compact biofiltration BMP maintenance plan consistent with manufacturer guidelines and conditions of its third-party certification (i.e., maintenance activities, frequencies)?	ration BMP nsistent with nes and -party ntenance ration BMP		guidelines and conditions of third-pa		
		Yes, and the BMP is either owned or operated by the City or in the public right of way.	The city engineer requirements, cost relevant previous operation and main ability to continue to that the vending cor		
	0	No	Stop . Compact biofil	tration BMP is not a ll owed.	

Provide basis for Criteria 7:

Include copy of manufacturer guidelines and conditions of third-party certification in the maintenance agreement. PDP SWQMP must include a statement that the compact BMP will be maintained in accordance with manufacturer guidelines and conditions of third-party certification.



Compact (high rate) Biofiltration BMP Checklist Form I-10						
Section 2: Verification (For City Use Only)						
Is the proposed compact BMP accepted by the City	0	Yes				
Engineer for onsite pollutant control compliance for	0	No, See expl	anation below			
the DMA?						
Explanation/reason if the compact BMP is not accepted	d by tl	he City for ons	ite pollutant control			
compliance:						





December 2015

GENERAL USE LEVEL DESIGNATION FOR BASIC, ENHANCED, AND PHOSPHORUS TREATMENT

For the

MWS-Linear Modular Wetland

Ecology's Decision:

Based on Modular Wetland Systems, Inc. application submissions, including the Technical Evaluation Report, dated April 1, 2014, Ecology hereby issues the following use level designation:

- 1. General use level designation (GULD) for the MWS-Linear Modular Wetland Stormwater Treatment System for Basic treatment
 - Sized at a hydraulic loading rate of 1 gallon per minute (gpm) per square foot (sq ft) of wetland cell surface area. For moderate pollutant loading rates (low to medium density residential basins), size the Prefilters at 3.0 gpm/sq ft of cartridge surface area. For high loading rates (commercial and industrial basins), size the Prefilters at 2.1 gpm/sq ft of cartridge surface area.
- 2. General use level designation (GULD) for the MWS-Linear Modular Wetland Stormwater Treatment System for Phosphorus treatment
 - Sized at a hydraulic loading rate of 1 gallon per minute (gpm) per square foot (sq ft) of wetland cell surface area. For moderate pollutant loading rates (low to medium density residential basins), size the Prefilters at 3.0 gpm/sq ft of cartridge surface area. For high loading rates (commercial and industrial basins), size the Prefilters at 2.1 gpm/sq ft of cartridge surface area.
- 3. General use level designation (GULD) for the MWS-Linear Modular Wetland Stormwater Treatment System for Enhanced treatment
 - Sized at a hydraulic loading rate of 1 gallon per minute (gpm) per square foot (sq ft) of wetland cell surface area. For moderate pollutant loading rates (low to medium density residential basins), size the Prefilters at 3.0 gpm/sq ft of cartridge surface area. For high loading rates (commercial and industrial basins), size the Prefilters at 2.1 gpm/sq ft of cartridge surface area.

- 4. Ecology approves the MWS Linear Modular Wetland Stormwater Treatment System units for Basic, Phosphorus, and Enhanced treatment at the hydraulic loading rate listed above. Designers shall calculate the water quality design flow rates using the following procedures:
 - Western Washington: For treatment installed upstream of detention or retention, the water quality design flow rate is the peak 15-minute flow rate as calculated using the latest version of the Western Washington Hydrology Model or other Ecology-approved continuous runoff model.
 - Eastern Washington: For treatment installed upstream of detention or retention, the water quality design flow rate is the peak 15-minute flow rate as calculated using one of the three methods described in Chapter 2.2.5 of the Stormwater Management Manual for Eastern Washington (SWMMEW) or local manual.
 - Entire State: For treatment installed downstream of detention, the water quality design flow rate is the full 2-year release rate of the detention facility.
- 5. These use level designations have no expiration date but may be revoked or amended by Ecology, and are subject to the conditions specified below.

Ecology's Conditions of Use:

Applicants shall comply with the following conditions:

- 1. Design, assemble, install, operate, and maintain the MWS Linear Modular Wetland Stormwater Treatment System units, in accordance with Modular Wetland Systems, Inc. applicable manuals and documents and the Ecology Decision.
- Each site plan must undergo Modular Wetland Systems, Inc. review and approval before
 site installation. This ensures that site grading and slope are appropriate for use of a MWS

 Linear Modular Wetland Stormwater Treatment System unit.
- 3. MWS Linear Modular Wetland Stormwater Treatment System media shall conform to the specifications submitted to, and approved by, Ecology.
- 4. The applicant tested the MWS Linear Modular Wetland Stormwater Treatment System with an external bypass weir. This weir limited the depth of water flowing through the media, and therefore the active treatment area, to below the root zone of the plants. This GULD applies to MWS Linear Modular Wetland Stormwater Treatment Systems whether plants are included in the final product or not.
- 5. Maintenance: The required maintenance interval for stormwater treatment devices is often dependent upon the degree of pollutant loading from a particular drainage basin. Therefore, Ecology does not endorse or recommend a "one size fits all" maintenance cycle for a particular model/size of manufactured filter treatment device.
 - Typically, Modular Wetland Systems, Inc. designs MWS Linear Modular Wetland systems for a target prefilter media life of 6 to 12 months.
 - Indications of the need for maintenance include effluent flow decreasing to below the design flow rate or decrease in treatment below required levels.
 - Owners/operators must inspect MWS Linear Modular Wetland systems for a minimum of twelve months from the start of post-construction operation to determine site-specific

maintenance schedules and requirements. You must conduct inspections monthly during the wet season, and every other month during the dry season. (According to the SWMMWW, the wet season in western Washington is October 1 to April 30. According to SWMMEW, the wet season in eastern Washington is October 1 to June 30). After the first year of operation, owners/operators must conduct inspections based on the findings during the first year of inspections.

- Conduct inspections by qualified personnel, follow manufacturer's guidelines, and use methods capable of determining either a decrease in treated effluent flowrate and/or a decrease in pollutant removal ability.
- When inspections are performed, the following findings typically serve as maintenance triggers:
 - Standing water remains in the vault between rain events, or
 - Bypass occurs during storms smaller than the design storm.
 - If excessive floatables (trash and debris) are present (but no standing water or excessive sedimentation), perform a minor maintenance consisting of gross solids removal, not prefilter media replacement.
 - Additional data collection will be used to create a correlation between pretreatment chamber sediment depth and pre-filter clogging (see *Issues to be Addressed by the Company* section below)
- 6. Discharges from the MWS Linear Modular Wetland Stormwater Treatment System units shall not cause or contribute to water quality standards violations in receiving waters.

Applicant: Modular Wetland Systems, Inc.

Applicant's Address: PO. Box 869

Oceanside, CA 92054

Application Documents:

- Original Application for Conditional Use Level Designation, Modular Wetland System, Linear Stormwater Filtration System Modular Wetland Systems, Inc., January 2011
- *Quality Assurance Project Plan*: Modular Wetland system Linear Treatment System performance Monitoring Project, draft, January 2011.
- Revised Application for Conditional Use Level Designation, Modular Wetland System, Linear Stormwater Filtration System Modular Wetland Systems, Inc., May 2011
- Memorandum: Modular Wetland System-Linear GULD Application Supplementary Data, April 2014
- Technical Evaluation Report: Modular Wetland System Stormwater Treatment System Performance Monitoring, April 2014.

Applicant's Use Level Request:

General use level designation as a Basic, Enhanced, and Phosphorus treatment device in accordance with Ecology's Guidance for Evaluating Emerging Stormwater Treatment Technologies Technology Assessment Protocol – Ecology (TAPE) January 2011 Revision.

Applicant's Performance Claims:

- The MWS Linear Modular wetland is capable of removing a minimum of 80-percent of TSS from stormwater with influent concentrations between 100 and 200 mg/l.
- The MWS Linear Modular wetland is capable of removing a minimum of 50-percent of Total Phosphorus from stormwater with influent concentrations between 0.1 and 0.5 mg/l.
- The MWS Linear Modular wetland is capable of removing a minimum of 30-percent of dissolved Copper from stormwater with influent concentrations between 0.005 and 0.020 mg/l.
- The MWS Linear Modular wetland is capable of removing a minimum of 60-percent of dissolved Zinc from stormwater with influent concentrations between 0.02 and 0.30 mg/l.

Ecology Recommendations:

 Modular Wetland Systems, Inc. has shown Ecology, through laboratory and fieldtesting, that the MWS - Linear Modular Wetland Stormwater Treatment System filter system is capable of attaining Ecology's Basic, Total phosphorus, and Enhanced treatment goals.

Findings of Fact:

Laboratory Testing

The MWS-Linear Modular wetland has the:

- Capability to remove 99 percent of total suspended solids (using Sil-Co-Sil 106) in a quarter-scale model with influent concentrations of 270 mg/L.
- Capability to remove 91 percent of total suspended solids (using Sil-Co-Sil 106) in laboratory conditions with influent concentrations of 84.6 mg/L at a flow rate of 3.0 gpm per square foot of media.
- Capability to remove 93 percent of dissolved Copper in a quarter-scale model with influent concentrations of 0.757 mg/L.
- Capability to remove 79 percent of dissolved Copper in laboratory conditions with influent concentrations of 0.567 mg/L at a flow rate of 3.0 gpm per square foot of media.
- Capability to remove 80.5-percent of dissolved Zinc in a quarter-scale model with influent concentrations of 0.95 mg/L at a flow rate of 3.0 gpm per square foot of media.
- Capability to remove 78-percent of dissolved Zinc in laboratory conditions with influent concentrations of 0.75 mg/L at a flow rate of 3.0 gpm per square foot of media.

Field Testing

- Modular Wetland Systems, Inc. conducted monitoring of an MWS-Linear (Model # MWS-L-4-13) from April 2012 through May 2013, at a transportation maintenance facility in Portland, Oregon. The manufacturer collected flow-weighted composite samples of the system's influent and effluent during 28 separate storm events. The system treated approximately 75 percent of the runoff from 53.5 inches of rainfall during the monitoring period. The applicant sized the system at 1 gpm/sq ft. (wetland media) and 3gpm/sq ft. (prefilter).
- Influent TSS concentrations for qualifying sampled storm events ranged from 20 to 339 mg/L. Average TSS removal for influent concentrations greater than 100 mg/L (n=7) averaged 85 percent. For influent concentrations in the range of 20-100 mg/L (n=18), the upper 95 percent confidence interval about the mean effluent concentration was 12.8 mg/L.
- Total phosphorus removal for 17 events with influent TP concentrations in the range of 0.1 to 0.5 mg/L averaged 65 percent. A bootstrap estimate of the lower 95 percent confidence limit (LCL95) of the mean total phosphorus reduction was 58 percent.
- The lower 95 percent confidence limit of the mean percent removal was 60.5 percent for dissolved zinc for influent concentrations in the range of 0.02 to 0.3 mg/L (n=11). The lower 95 percent confidence limit of the mean percent removal was 32.5 percent for dissolved copper for influent concentrations in the range of 0.005 to 0.02 mg/L (n=14) at flow rates up to 28 gpm (design flow rate 41 gpm). Laboratory test data augmented the data set, showing dissolved copper removal at the design flow rate of 41 gpm (93 percent reduction in influent dissolved copper of 0.757 mg/L).

Issues to be addressed by the Company:

- 1. Modular Wetland Systems, Inc. should collect maintenance and inspection data for the first year on all installations in the Northwest in order to assess standard maintenance requirements for various land uses in the region. Modular Wetland Systems, Inc. should use these data to establish required maintenance cycles.
- 2. Modular Wetland Systems, Inc. should collect pre-treatment chamber sediment depth data for the first year of operation for all installations in the Northwest. Modular Wetland Systems, Inc. will use these data to create a correlation between sediment depth and pre-filter clogging.

Technology Description:

Download at http://www.modularwetlands.com/

Contact Information:

Applicant: Greg Kent

Modular Wetland Systems, Inc.

P.O. Box 869

Oceanside, CA 92054

gkent@biocleanenvironmental.net

Applicant website: http://www.modularwetlands.com/

Ecology web link: http://www.ecy.wa.gov/programs/wg/stormwater/newtech/index.html

Ecology: Douglas C. Howie, P.E.

Department of Ecology Water Quality Program

(360) 407-6444

douglas.howie@ecy.wa.gov

Revision History

Date	Revision
June 2011	Original use-level-designation document
September 2012	Revised dates for TER and expiration
January 2013	Modified Design Storm Description, added Revision Table, added maintenance discussion, modified format in accordance with Ecology standard
December 2013	Updated name of Applicant
April 2014	Approved GULD designation for Basic, Phosphorus, and Enhanced treatment
December 2015	Updated GULD to document the acceptance of MWS-Linear Modular Wetland installations with or without the inclusion of plants.

Project Name:		
ΓHIS PAGE INTENTIONALLY LEFT	' BLANK FOR DOUBLE-SIDED PRIN	ITING
THIS PAGE INTENTIONALLY LEFT	BLANK FOR DOUBLE-SIDED PRIN	TING
THIS PAGE INTENTIONALLY LEFT	BLANK FOR DOUBLE-SIDED PRIN	TING
THIS PAGE INTENTIONALLY LEFT	BLANK FOR DOUBLE-SIDED PRIN	TING
THIS PAGE INTENTIONALLY LEFT	BLANK FOR DOUBLE-SIDED PRIN	TING
THIS PAGE INTENTIONALLY LEFT	BLANK FOR DOUBLE-SIDED PRIN	TING
THIS PAGE INTENTIONALLY LEFT	BLANK FOR DOUBLE-SIDED PRIN	TING
THIS PAGE INTENTIONALLY LEFT	BLANK FOR DOUBLE-SIDED PRIN	TING
THIS PAGE INTENTIONALLY LEFT	BLANK FOR DOUBLE-SIDED PRIN	TING
THIS PAGE INTENTIONALLY LEFT	BLANK FOR DOUBLE-SIDED PRIN	TING
THIS PAGE INTENTIONALLY LEFT	BLANK FOR DOUBLE-SIDED PRIN	TING
THIS PAGE INTENTIONALLY LEFT	BLANK FOR DOUBLE-SIDED PRIN	TING
THIS PAGE INTENTIONALLY LEFT	BLANK FOR DOUBLE-SIDED PRIN	TING

Attachment 2 Backup for PDP Hydromodification Control Measures

This is the cover sheet for Attachment 2.

Mark this box if this attachment is empty because the project is exempt from PDF
hydromodification management requirements.

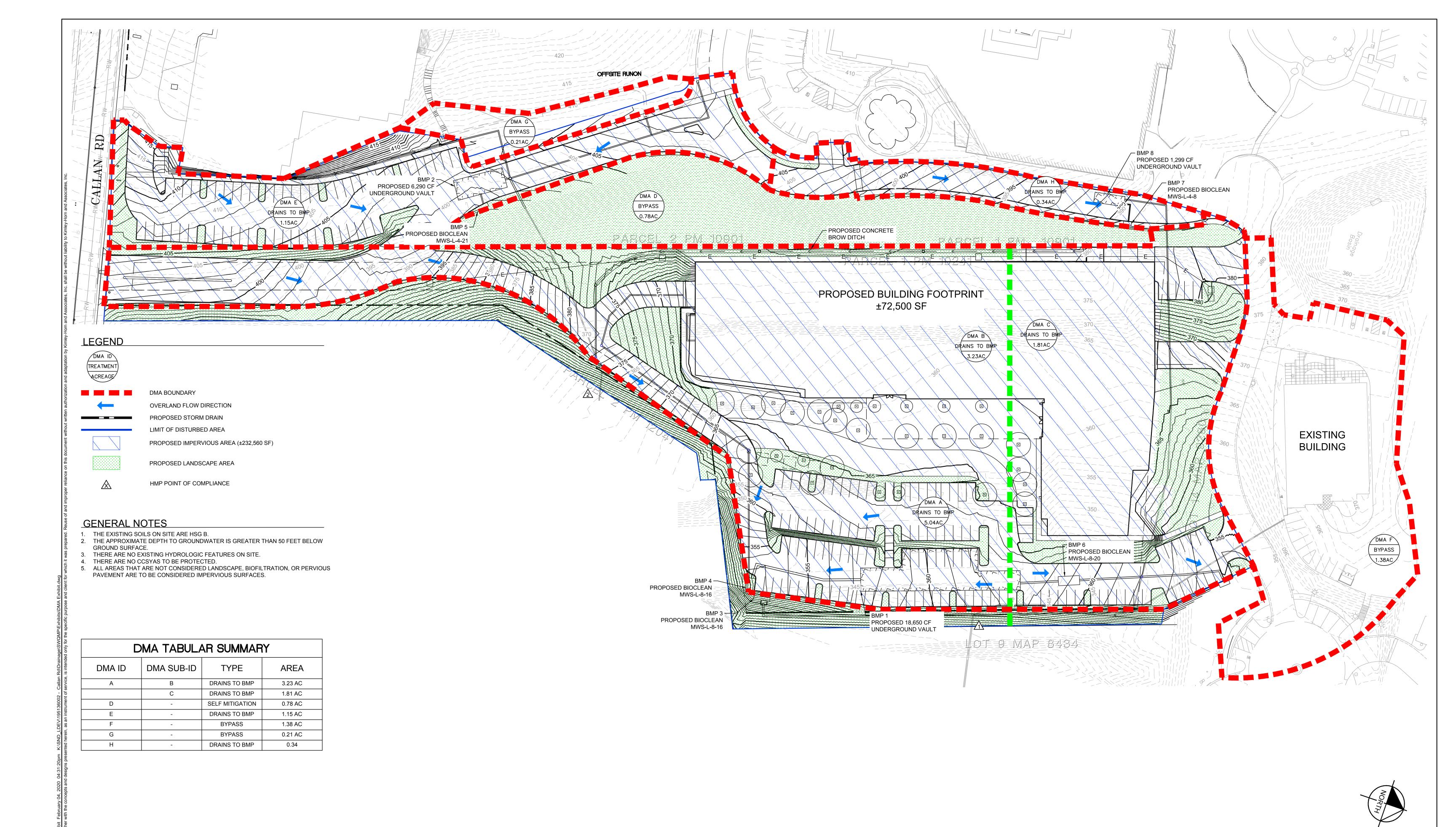
Indicate which Items are Included:

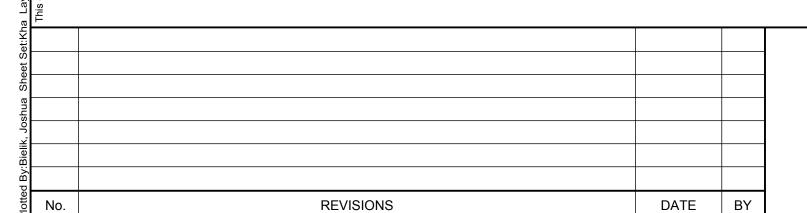
Attachment Sequence	Contents	Checklist		
Attachment 2a	Hydromodification Management Exhibit (Required)	Included See Hydromodification Management Exhibit Checklist.		
Attachment 2b	Management of Critical Coarse Sediment Yield Areas (WMAA Exhibit is required, additional analyses are optional) See Section 6.2 of the BMP Design Manual.	Exhibit showing project drainage boundaries marked on WMAA Critical Coarse Sediment Yield Area Map (Required) Optional analyses for Critical Coarse Sediment Yield Area Determination 6.2.1 Verification of Geomorphic Landscape Units Onsite 6.2.2 Downstream Systems Sensitivity to Coarse Sediment 6.2.3 Optional Additional Analysis of Potential Critical Coarse Sediment Yield Areas Onsite		
Attachment 2c	Geomorphic Assessment of Receiving Channels (Optional) See Section 6.3.4 of the BMP Design Manual.	☐ Not Performed ☐ Included ☐ Submitted as separate standalone document		
Flow Control Facility Design and Structural BMP Drawdown Calculations (Required) Attachment 2d Overflow Design Summary for each structural BMP See Chapter 6 and Appendix G of the BMP Design Manual		Included Submitted as separate stand- alone document		

Use this checklist to ensure the required information has been included on the Hydromodification Management Exhibit:

The Hydromodification Management Exhibit must identify:
Underlying hydrologic soil group
Approximate depth to groundwater
Existing natural hydrologic features (watercourses, seeps, springs, wetlands)
Critical coarse sediment yield areas to be protected OR provide a separate map
showing that the project site is outside of any critical coarse sediment yield areas
Existing topography
Existing and proposed site drainage network and connections to drainage offsite
Proposed grading
Proposed impervious features
Proposed design features and surface treatments used to minimize imperviousness
Point(s) of Compliance (POC) for Hydromodification Management
Existing and proposed drainage boundary and drainage area to each POC (when
necessary, create separate exhibits for pre-development and post-project
conditions)
Structural BMPs for hydromodification management (identify location, type of BMP, and
size/detail)









KHA PROJECT		
195136002		
DATE		
2	/4/2020	
SCALE	AS SHOWN	
DESIGNED BY		
DD AVAIN DV		

CHECKED BY

CITY OF SAN DIEGO

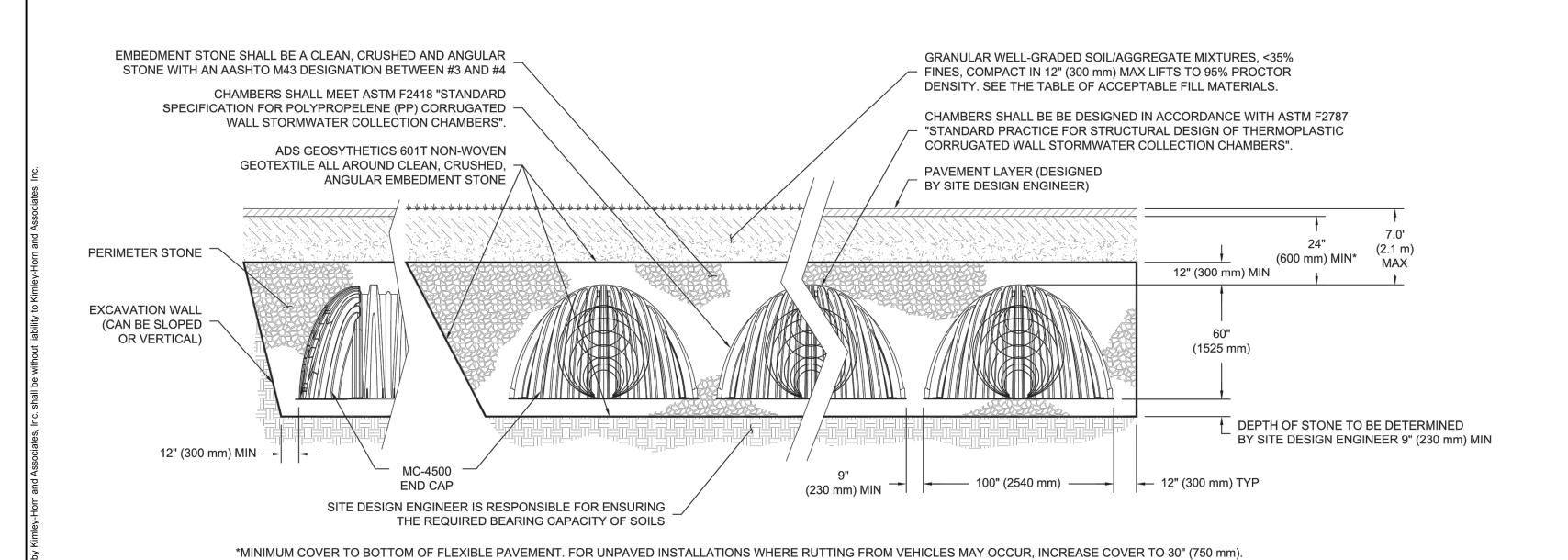
3020 CALLAN ROAD

PREPARED FOR

HEALTHPEAK

PROPOSED DMA/HMP EXHIBIT

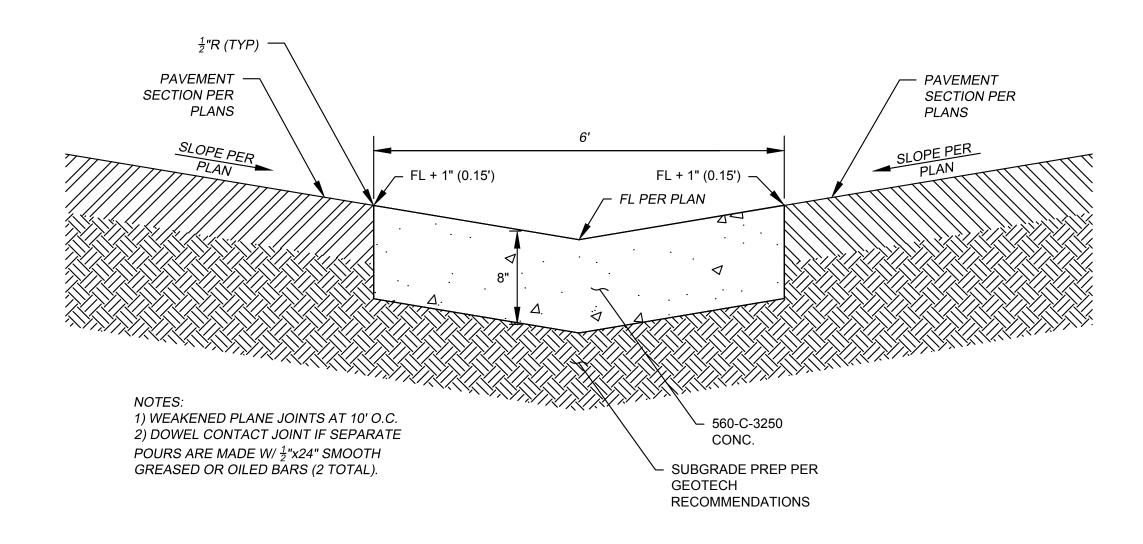
SHEET NUMBER
1
OF
3
•



A UNDERGROUND CISTERN CROSS SECTION NOT TO SCALE

BROW DITCH

NOT TO SCALE



RIBBON GUTTER

NOT TO SCALE

D MODIFIED TYPE A4 CATCH BASIN
NOT TO SCALE

_ ∵				
Set:Kh				
set S				
Sheet				
Joshua				
:Bielik,				
B)				
otted	No.	REVISIONS	DATE	BY

Kinley» Horn
© 2020 KIMLEY-HORN AND ASSOCIATES, INC.
401 B STREET, SUITE 600; SAN DIEGO, CA 92101
PHONE: 619-234-9411
WWW.KIMLEY-HORN.COM

KHA PROJECT		
195136002		
DATE 2/4/2020		
	4/2020	
SCALE	AS SHOWN	
DESIGNE	D BY	
DRAWN E	BY	

CHECKED BY

CITY OF SAN DIEGO

3020 CALLAN ROAD

PREPARED FOR

HEALTHPEAK

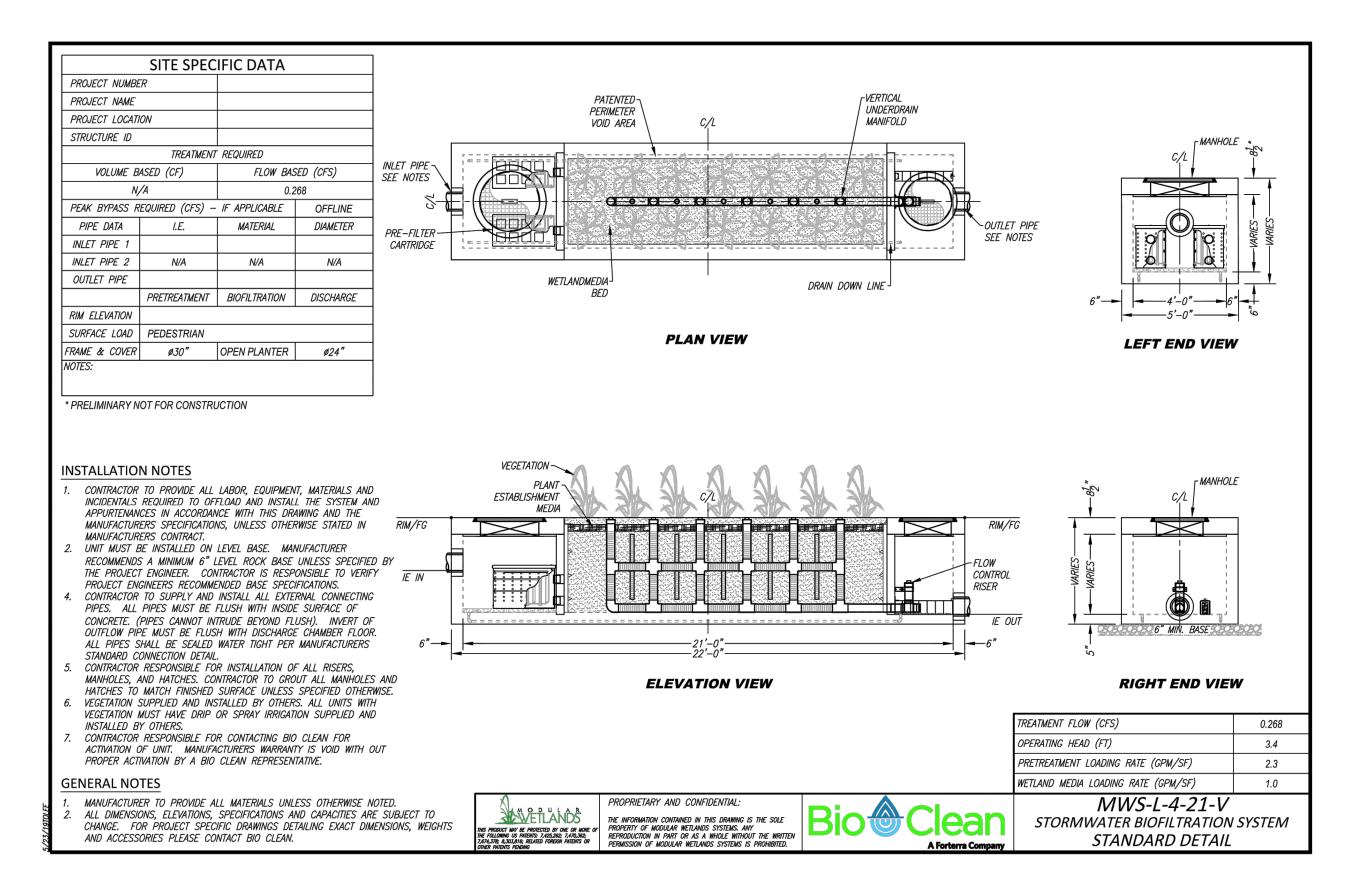
CA

PROPOSED DMA/HMP EXHIBIT

SHEET NUMBER

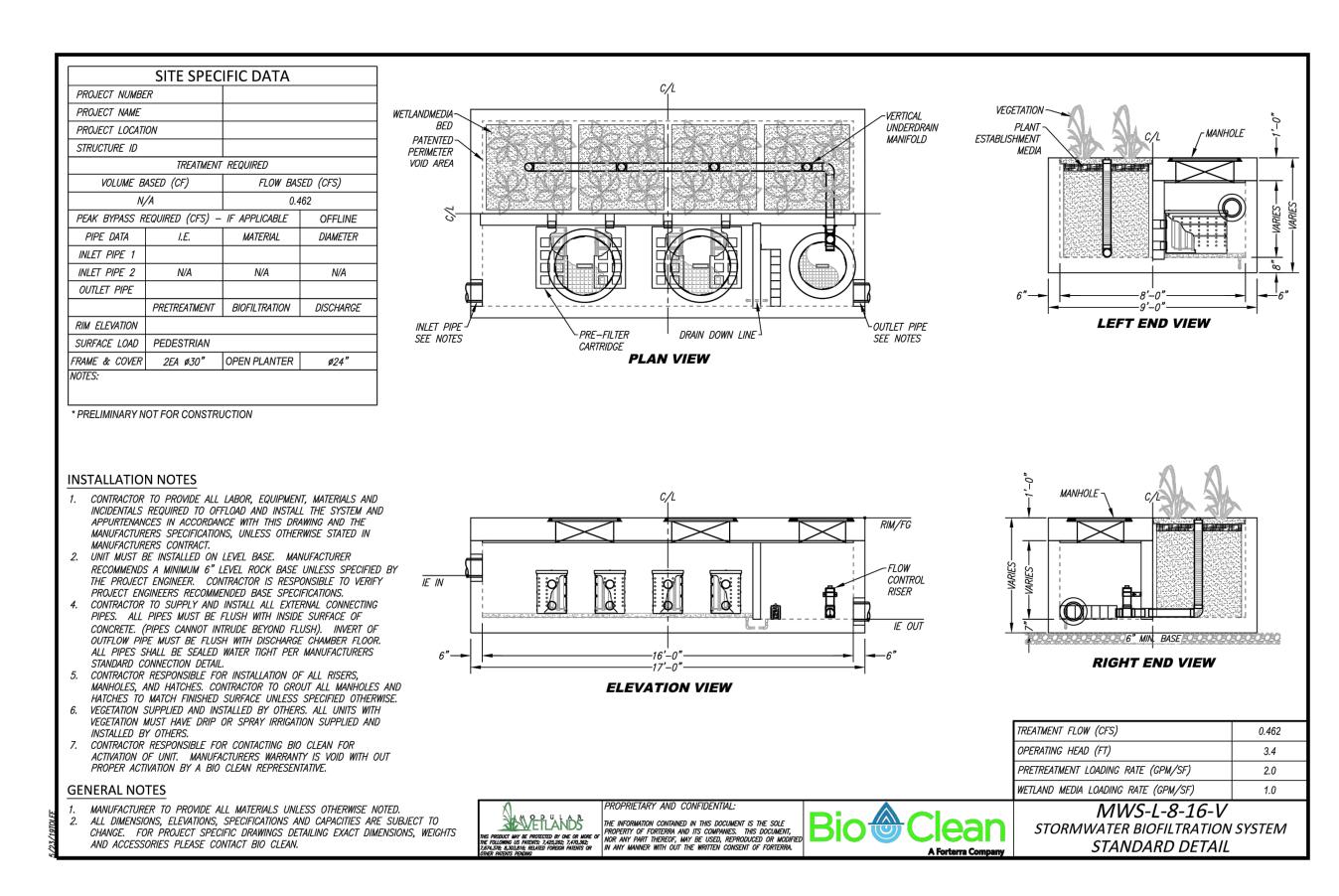
OF

3

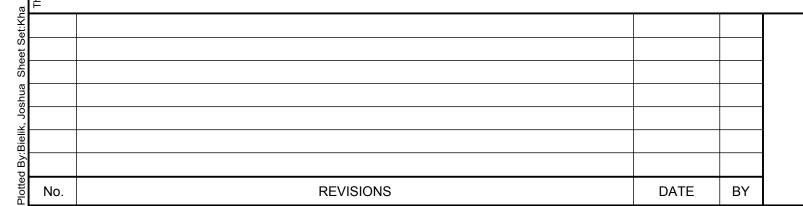


MWS-L-4-21-V STORMWATER BIOFILTRATION SYSTEM STANDARD DETAIL

NOT TO SCALE

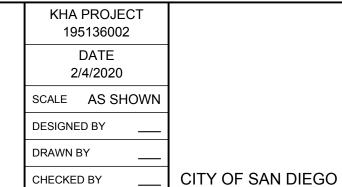


C MWS-L-8-16-V STORMWATER BIOFILTRATION SYSTEM STANDARD DETAIL





WWW.KIMLEY-HORN.COM



3020 CALLAN ROAD

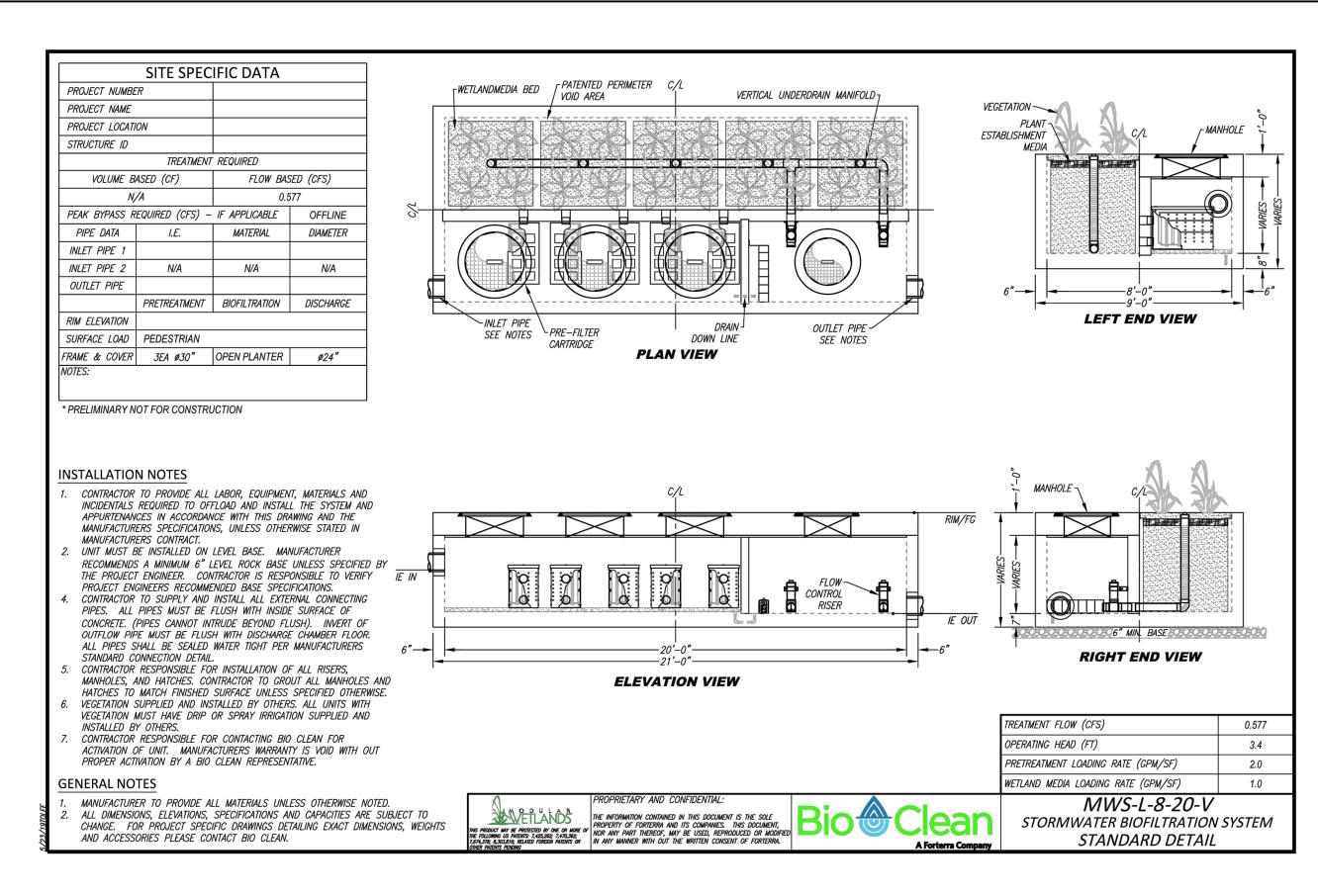
PREPARED FOR

HEALTHPEAK

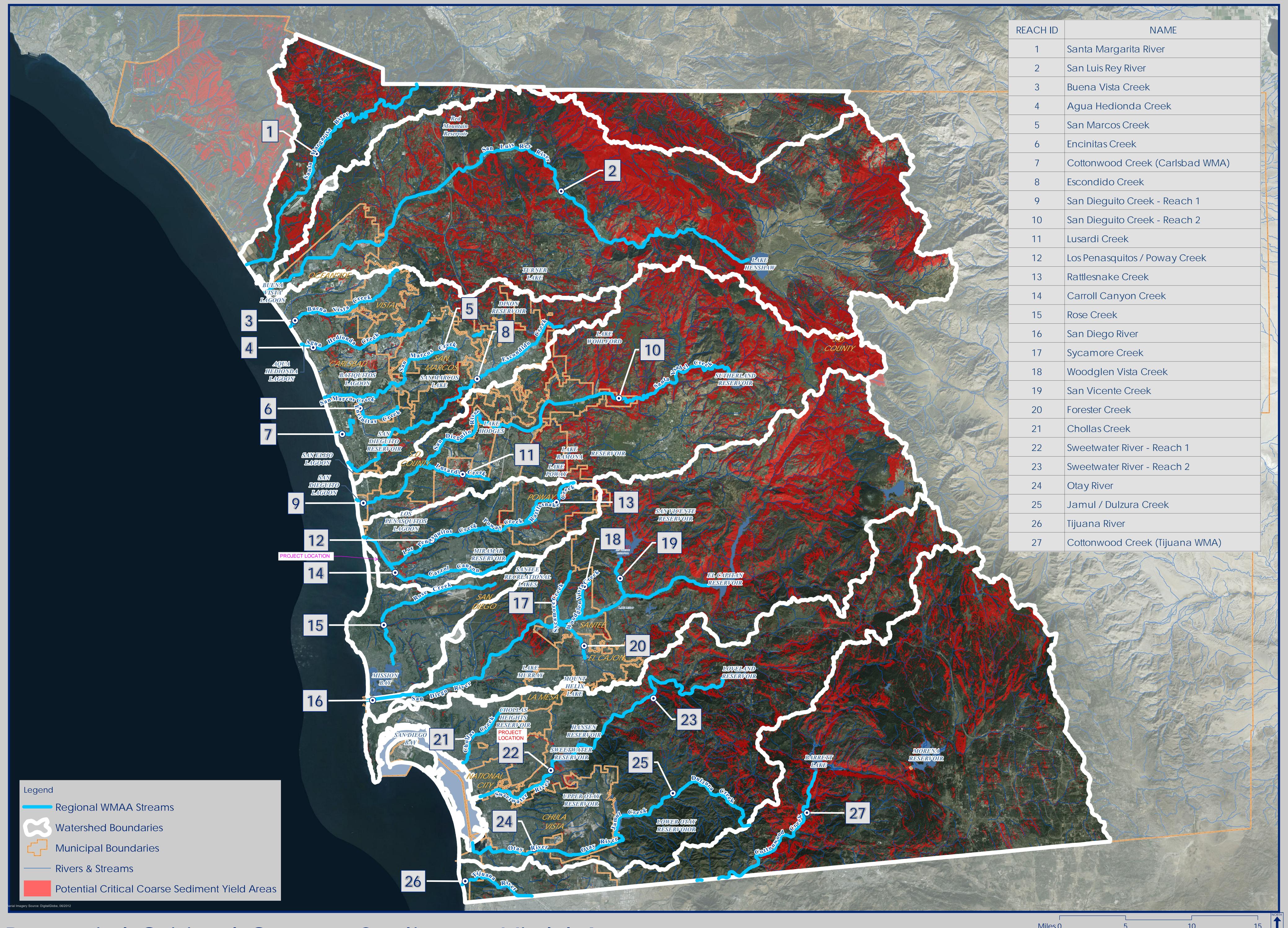
CA

PROPOSED DMA/HMP EXHIBIT

3 OF 3



B MWS-L-8-20-V STORMWATER BIOFILTRATION SYSTEM STANDARD DETAIL



Potential Critical Coarse Sediment Yield Areas Regional San Diego County Watersheds





Appendix G: Guidance for Continuous Simulation and Hydromodification Sizing Factors

biofiltered, project-specific continuous simulation modeling is recommended. Refer to Sections 5.6 and 6.3.6.

Table G.2-6: Sizing Factors for Hydromodification Flow Control Cistern BMPs Designed Using Sizing Factor Method

Lower Flow Threshold	Soil Group	Slope	Rain Gauge	V
0.1Q ₂	A	Flat	Lindbergh	0.54
$0.1Q_{2}$	A	Moderate	Lindbergh	0.51
0.1Q ₂	A	Steep	Lindbergh	0.49
0.1Q ₂	В	Flat	Lindbergh	0.19
0.1Q ₂	В	Moderate	Lindbergh	0.18
0.1Q ₂	В	Steep	Lindbergh	0.18
0.1Q ₂	С	Flat	Lindbergh	0.11
0.1Q ₂	С	Moderate	Lindbergh	0.11
0.1Q ₂	С	Steep	Lindbergh	0.11
0.1Q ₂	D	Flat	Lindbergh	0.09
0.1Q ₂	D	Moderate	Lindbergh	0.09
0.1Q ₂	D	Steep	Lindbergh	0.09
0.1Q ₂	A	Flat	Oceanside	0.26
0.1Q ₂	A	Moderate	Oceanside	0.25
0.1Q ₂	A	Steep	Oceanside	0.25
0.1Q ₂	В	Flat	Oceanside	0.16
0.1Q ₂	В	Moderate	Oceanside	0.16
0.1Q ₂	В	Steep	Oceanside	0.16
0.1Q ₂	С	Flat	Oceanside	0.14
0.1Q ₂	С	Moderate	Oceanside	0.14
0.1Q ₂	С	Steep	Oceanside	0.14
0.1Q ₂	D	Flat	Oceanside	0.12
0.1Q ₂	D	Moderate	Oceanside	0.12
0.1Q ₂	D	Steep	Oceanside	0.12
0.1Q ₂	A	Flat	L Wohlford	0.53
0.1Q ₂	A	Moderate	L Wohlford	0.49
0.1Q ₂	A	Steep	L Wohlford	0.49
0.1Q ₂	В	Flat	L Wohlford	0.28
0.1Q ₂	В	Moderate	L Wohlford	0.28
0.1Q ₂	В	Steep	L Wohlford	0.28



Appendix G: Guidance for Continuous Simulation and Hydromodification Sizing Factors

Rain Gauge	Soil	Slope	Q ₂ (cfs/acre)	Q ₁₀ (cfs/ac)
Oceanside	В	Low	0.377	0.875
Oceanside	В	Moderate	0.391	0.879
Oceanside	В	Steep	0.395	0.881
Oceanside	С	Low	0.488	0.981
Oceanside	С	Moderate	0.497	0.985
Oceanside	С	Steep	0.499	0.986
Oceanside	D	Low	0.571	0.998
Oceanside	D	Moderate	0.575	0.999
Oceanside	D	Steep	0.576	0.999
Lindbergh	A	Low	0.057	0.384
Lindbergh	A	Moderate	0.073	0.399
Lindbergh	A	Steep	0.082	0.403
Lindbergh	В	Low	0.199	0.496
Lindbergh	В	Moderate	0.220	0.509
Lindbergh	В	Steep	0.230	0.513
Lindbergh	С	Low	0.335	0.601
Lindbergh	С	Moderate	0.349	0.610
Lindbergh	С	Steep	0.354	0.613
Lindbergh	D	Low	0.429	0.751
Lindbergh	D	Moderate	0.437	0.753
Lindbergh	D	Steep	0.439	0.753



BMP Sizing Spreadsheet V3.0

Project Name:	3020 Callan Road
Project Applicant:	Healthpeak
Jurisdiction:	City of San Diego
Parcel (APN):	340-010-44-00
Hydrologic Unit:	D
Rain Gauge:	Lindbergh
Total Project Area (sf):	303,612
Channel Susceptibility:	High

BMP Sizing Spreadsheet V3.0			
Project Name:	3020 Callan Road	Hydrologic Unit:	D
Project Applicant:	Healthpeak	Rain Gauge:	Lindbergh
Jurisdiction:	City of San Diego	Total Project Area:	303,612
Parcel (APN):	340-010-44-00	Low Flow Threshold:	0.1Q2
BMP Name:	BMP 1,2, 8	BMP Type:	Cistern
BMP Native Soil Type:	D	BMP Infiltration Rate (in/hr):	NA

			Areas Draining to BMP			HMP Sizing Factors	Minimum BMP Size
DMA Name	Area (sf)	Pre Project Soil Type	Pre-Project Slope	Post Project Surface Type	Area Weighted Runoff Factor (Table G.2-1) ¹	Volume	Volume (CF)
В	157,687	D	Steep	Mixed	0.9	0.09	12063
С	81,021	D	Steep	Mixed	0.9	0.09	6198
E	50,094	D	Steep	Mixed	0.9	0.09	3832
H	14,810	D	Steep	Mixed	0.9	0.09	1133
						0	0
						0	0
						0	0
						0	0
						0	0
						0	0
						0	0
						0	0
						0	0
						0	0
						0	0
BMP Tributary Area	303,612					Minimum BMP Size	23226
		_				Proposed BMP Size*	

* Assumes standard configuration

Proposed bivir size	
3.5	ft
3.5	ft
6636	CF
	3.5 3.5

Notes:

1. Runoff factors which are used for hydromodification management flow control (Table G.2-1) are different from the runoff factors used for pollutant control BMP sizing (Table B.1-1). Table references are taken from the San Diego Region Model BMP Design Manua

Describe the BMP's in sufficient detail in your PDP SWOMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

BMP's must be adapted and applied to the conditions specific to the development project such as unstable slopes or the lack of available head. Designated Staff have final review and approval authority over the project design.

This BMP Sizing Spreadsheet has been updated in conformance with the San Diego Region Model BMP Design Manual, April 2018. For questions or concerns please contact the jurisdiction in which your project is located.

BMP Sizing Spreadsheet V3.0			
Project Name:	3020 Callan Road	Hydrologic Unit:	D
Project Applicant:	Healthpeak	Rain Gauge:	Lindbergh
Jurisdiction:	City of San Diego	Total Project Area:	303,612
Parcel (APN):	340-010-44-00	Low Flow Threshold:	0.1Q2
BMP Name	BMP 1,2, 8	BMP Type:	Cistern

DMA	Rain Gauge		oped Condition	Unit Runoff Ratio	DMA Area (ac)	Orifice Flow - %Q ₂	Orifice Area (in²)
Name		Soil Type	Slope	(cfs/ac)		(cfs)	(111)
В	Lindbergh	D	Steep	0.439	3.620	0.159	2.35
С	Lindbergh	D	Steep	0.439	1.860	0.082	1.20
E	Lindbergh	D	Steep	0.439	1.150	0.050	0.74
Н	Lindbergh	D	Steep	0.439	0.340	0.015	0.22

3.50	0.306	4.52	2.40
Max Orifice Head	Max Tot. Allowable	Max Tot. Allowable	Max Orifice
iviax Office nead	Orifice Flow	Orifice Area	Diameter
(feet)	(cfs)	(in ²)	(in)

Provide Hand Calc.	0.043	0.64	0.900
Average outflow during surface drawdown	Max Orifice Outflow	Actual Orifice Area	Selected Orifice Diameter
(cfs)	(cfs)	(in ²)	(in)

Drawdown (Hrs) Provide Hand Calculation

Project Name:				
THIS PAGE IN	TENTIONALLY	LEFT BLANK F	OR DOUBLE-SIDI	ED PRINTING

Attachment 3 Structural BMP Maintenance Information

This is the cover sheet for Attachment 3.



Project Name:	
	V EAD DAIIDI E-CIDED DDINTINA
THIS PAGE INTENTIONALLY LEFT BLAN	R FOR DOUBLE-SIDED FRINTING
THIS PAGE INTENTIONALLY LEFT BLAN	R FOR DOUBLE-SIDED FRINTING
THIS PAGE INTENTIONALLY LEFT BLAN	R FOR DOUBLE-SIDED FRINTING
THIS PAGE INTENTIONALLY LEFT BLAN	R FOR DOUBLE-SIDED FRINTING
THIS PAGE INTENTIONALLY LEFT BLAN	R FOR DOUBLE-SIDED FRINTING
THIS PAGE INTENTIONALLY LEFT BLAN	R FOR DOUBLE-SIDED FRINTING
THIS PAGE INTENTIONALLY LEFT BLAN	R FOR DOUBLE-SIDED FRINTING
THIS PAGE INTENTIONALLY LEFT BLAN	R FOR DOUBLE-SIDED FRINTING
THIS PAGE INTENTIONALLY LEFT BLAN	R FOR DOUBLE-SIDED FRINTING
THIS PAGE INTENTIONALLY LEFT BLAN	R FOR DOUBLE-SIDED FRINTING
THIS PAGE INTENTIONALLY LEFT BLAN	R FOR DOUBLE-SIDED FRINTING
THIS PAGE INTENTIONALLY LEFT BLAN	R FOR DOUBLE-SIDED FRINTING
THIS PAGE INTENTIONALLY LEFT BLAN	R FOR DOUBLE-SIDED FRINTING

Indicate which Items are Included:

Attachment Sequence	Contents	Checklist	
Attachment 3	Maintenance Agreement (Form	Included	
Attacimient 3	DS-3247) (when applicable)	Not applicable	

Use this checklist to ensure the required information has been included in the Structural BMP Maintenance Information Attachment:

Attachment 3: For private entity operation and maintenance, Attachment 3 must
include a Storm Water Management and Discharge Control Maintenance Agreement (Form
DS-3247). The following information must be included in the exhibits attached to the
maintenance agreement:
Vicinity map
Site design BMPs for which DCV reduction is claimed for meeting the pollutant
control obligations.
BMP and HMP location and dimensions
BMP and HMP specifications/cross section/model
Maintenance recommendations and frequency
LID features such as (permeable paver and LS location, dim, SF).

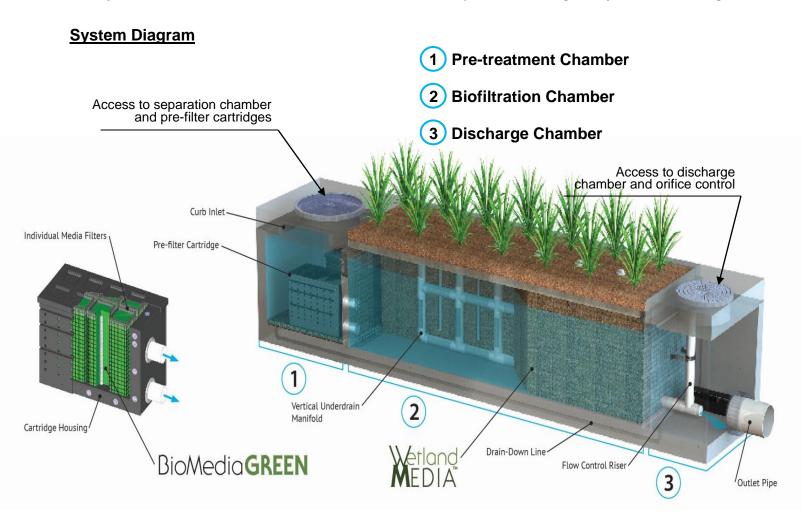




Inspection Guidelines for Modular Wetland System - Linear

Inspection Summary

- Inspect Pre-Treatment, Biofiltration and Discharge Chambers average inspection interval is 6 to 12 months.
 - (15 minute average inspection time).
- NOTE: Pollutant loading varies greatly from site to site and no two sites are the same. Therefore, the first year requires inspection monthly during the wet season and every other month during the dry season in order to observe and record the amount of pollutant loading the system is receiving.





Inspection Overview

As with all stormwater BMPs inspection and maintenance on the MWS Linear is necessary. Stormwater regulations require that all BMPs be inspected and maintained to ensure they are operating as designed to allow for effective pollutant removal and provide protection to receiving water bodies. It is recommended that inspections be performed multiple times during the first year to assess the site specific loading conditions. This is recommended because pollutant loading and pollutant characteristics can vary greatly from site to site. Variables such as nearby soil erosion or construction sites, winter sanding on roads, amount of daily traffic and land use can increase pollutant loading on the system. The first year of inspections can be used to set inspection and maintenance intervals for subsequent years to ensure appropriate maintenance is provided. Without appropriate maintenance a BMP will exceed its storage capacity which can negatively affect its continued performance in removing and retaining captured pollutants.

Inspection Equipment

Following is a list of equipment to allow for simple and effective inspection of the MWS Linear:

- Modular Wetland Inspection Form
- Flashlight
- Manhole hook or appropriate tools to remove access hatches and covers
- Appropriate traffic control signage and procedures
- Measuring pole and/or tape measure.
- Protective clothing and eye protection.
- 7/16" open or closed ended wrench.
- Large permanent black marker (initial inspections only first year)
- Note: entering a confined space requires appropriate safety and certification. It is generally not required for routine inspections of the system.



















Inspection Steps

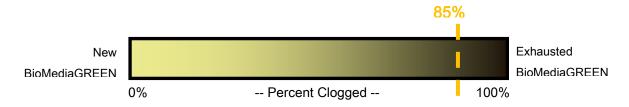
The core to any successful stormwater BMP maintenance program is routine inspections. The inspection steps required on the MWS Linear are quick and easy. As mentioned above the first year should be seen as the maintenance interval establishment phase. During the first year more frequent inspections should occur in order to gather loading data and maintenance requirements for that specific site. This information can be used to establish a base for long term inspection and maintenance interval requirements.

The MWS Linear can be inspected though visual observation without entry into the system. All necessary pre-inspection steps must be carried out before inspection occurs, especially traffic control and other safety measures to protect the inspector and near-by pedestrians from any dangers associated with an open access hatch or manhole. Once these access covers have been safely opened the inspection process can proceed:

- Prepare the inspection form by writing in the necessary information including project name,
 location, date & time, unit number and other info (see inspection form).
- Observe the inside of the system through the access hatches. If minimal light is available and vision into the unit is impaired utilize a flashlight to see inside the system and all of its chambers.
- Look for any out of the ordinary obstructions in the inflow pipe, pre-treatment chamber, biofiltration chamber, discharge chamber or outflow pipe. Write down any observations on the inspection form.
- Through observation and/or digital photographs estimate the amount of trash, debris and sediment accumulated in the pre-treatment chamber. Utilizing a tape measure or measuring stick estimate the amount of trash, debris and sediment in this chamber. Record this depth on the inspection form.



• Through visual observation inspect the condition of the pre-filter cartridges. Look for excessive build-up of sediments on the cartridges, any build-up on the top of the cartridges, or clogging of the holes. Record this information on the inspection form. The pre-filter cartridges can further be inspected by removing the cartridge tops and assessing the color of the BioMediaGREEN filter cubes (requires entry into pre-treatment chamber – see notes above regarding confined space entry). Record the color of the material. New material is a light green in color. As the media becomes clogged it will turn darker in color, eventually becoming dark brown or black. Using the below color indicator record the percentage of media exhausted.



- The biofiltration chamber is generally maintenance free due to the system's advanced pretreatment chamber. For units which have open planters with vegetation it is recommended that the vegetation be inspected. Look for any plants that are dead or showing signs of disease or other negative stressors. Record the general health of the plants on the inspection and indicate through visual observation or digital photographs if trimming of the vegetation is needed.
- The discharge chamber houses the orifice control structure, drain down filter and is connected to the outflow pipe. It is important to check to ensure the orifice is in proper operating conditions and free of any obstructions. It is also important to assess the condition of the drain down filter media which utilizes a block form of the BioMediaGREEN. Assess in the same manner as the cubes in the Pre-Filter Cartridge as mentioned above. Generally, the discharge chamber will be clean and free of debris. Inspect the water marks on the side walls. If possible, inspect the discharge chamber during a rain event to assess the amount of flow leaving the system while it is at 100% capacity (pre-treatment chamber water level at peak HGL). The water level of the flowing water should be compared to the watermark level on the side walls which is an indicator of the highest discharge rate the system achieved when initially installed. Record on the form is there is any difference in level from watermark in inches.



NOTE: During the first few storms the water level in the outflow chamber should be observed
and a 6" long horizontal watermark line drawn (using a large permanent marker) at the water
level in the discharge chamber while the system is operating at 100% capacity. The diagram
below illustrates where a line should be drawn. This line is a reference point for future
inspections of the system:







Using a permanent marker draw a 6 inch long horizontal line, as shown, at the higher water level in the MWS Linear discharge chamber.

- Water level in the discharge chamber is a function of flow rate and pipe size. Observation of water level during the first few months of operation can be used as a benchmark level for future inspections. The initial mark and all future observations shall be made when system is at 100% capacity (water level at maximum level in pre-treatment chamber). If future water levels are below this mark when system is at 100% capacity this is an indicator that maintenance to the pre-filter cartridges may be needed.
- Finalize inspection report for analysis by the maintenance manager to determine if maintenance is required.



Maintenance Indicators

Based upon observations made during inspection, maintenance of the system may be required based on the following indicators:

- Missing or damaged internal components or cartridges.
- · Obstructions in the system or its inlet or outlet.
- Excessive accumulation of floatables in the pre-treatment chamber in which the length and width of the chamber is fully impacted more than 18".



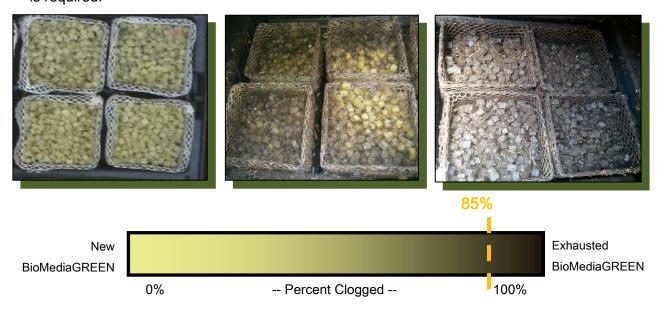
• Excessive accumulation of sediment in the pre-treatment chamber of more than 6" in depth.



www.modularwetlands.com



 Excessive accumulation of sediment on the BioMediaGREEN media housed within the prefilter cartridges. The following chart shows photos of the condition of the BioMediaGREEN contained within the pre-filter cartridges. When media is more than 85% clogged replacement is required.



 Excessive accumulation of sediment on the BioMediaGREEN media housed within the drain down filter. The following photos show of the condition of the BioMediaGREEN contained within the drain down filter. When media is more than 85% clogged replacement is required.





www.modularwetlands.com



• Overgrown vegetation.





 Water level in discharge chamber during 100% operating capacity (pre-treatment chamber water level at max height) is lower than the watermark by 20%.



Inspection Notes

- Following maintenance and/or inspection, it is recommended the maintenance operator
 prepare a maintenance/inspection record. The record should include any maintenance
 activities performed, amount and description of debris collected, and condition of the
 system and its various filter mechanisms.
- 2. The owner should keep maintenance/inspection record(s) for a minimum of five years from the date of maintenance. These records should be made available to the governing municipality for inspection upon request at any time.
- 3. Transport all debris, trash, organics and sediments to approved facility for disposal in accordance with local and state requirements.
- 4. Entry into chambers may require confined space training based on state and local regulations.
- 5. No fertilizer shall be used in the Biofiltration Chamber.
- 6. Irrigation should be provided as recommended by manufacturer and/or landscape architect. Amount of irrigation required is dependent on plant species. Some plants may not require irrigation after initial establishment.



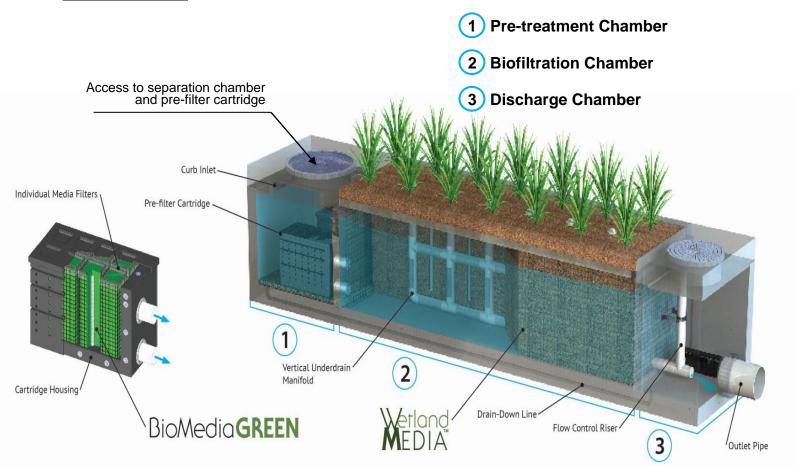


Maintenance Guidelines for Modular Wetland System - Linear

Maintenance Summary

- Remove Sediment from Pre-Treatment Chamber average maintenance interval is 12 to 24 months.
 - (10 minute average service time).
- Replace Pre-Filter Cartridge Media average maintenance interval 12 to 24 months.
 - (10-15 minute per cartridge average service time).
- Trim Vegetation average maintenance interval is 6 to 12 months.
 - (Service time varies).

System Diagram





Maintenance Overview

The time has come to maintain your Modular Wetland System Linear (MWS Linear). To ensure successful and efficient maintenance on the system we recommend the following. The MWS Linear can be maintained by removing the access hatches over the systems various chambers. All necessary pre-maintenance steps must be carried out before maintenance occurs, especially traffic control and other safety measures to protect the inspector and near-by pedestrians from any dangers associated with an open access hatch or manhole. Once traffic control has been set up per local and state regulations and access covers have been safely opened the maintenance process can begin. It should be noted that some maintenance activities require confined space entry. All confined space requirements must be strictly followed before entry into the system. In addition the following is recommended:

- Prepare the maintenance form by writing in the necessary information including project name, location, date & time, unit number and other info (see maintenance form).
- Set up all appropriate safety and cleaning equipment.
- Ensure traffic control is set up and properly positioned.
- Prepare a pre-checks (OSHA, safety, confined space entry) are performed.

Maintenance Equipment

Following is a list of equipment required for maintenance of the MWS Linear:

- Modular Wetland Maintenance Form
- Manhole hook or appropriate tools to access hatches and covers
- Protective clothing, flashlight and eye protection.
- 7/16" open or closed ended wrench.
- Vacuum assisted truck with pressure washer.
- Replacement BioMediaGREEN for Pre-Filter Cartridges if required (order from manufacturer).

















Maintenance Steps

- 1. Pre-treatment Chamber (bottom of chamber)
 - A. Remove access hatch or manhole cover over pre-treatment chamber and position vacuum truck accordingly.
 - B. With a pressure washer spray down pollutants accumulated on walls and pre-filter cartridges.
 - C. Vacuum out Pre-Treatment Chamber and remove all accumulated pollutants including trash, debris and sediments. Be sure to vacuum the floor until pervious pavers are visible and clean.
 - D. If Pre-Filter Cartridges require media replacement move onto step 2. If not, replace access hatch or manhole cover.



Removal of access hatch to gain access below.



Insertion of vacuum hose into separation chamber.



Removal of trash, sediment and debris.



Fully cleaned separation chamber.



- 2. Pre-Filter Cartridges (attached to wall of pre-treatment chamber)
 - A. After finishing step 1 enter pre-treatment chamber.
 - B. Unscrew the two bolts holding the lid on each cartridge filter and remove lid.



Pre-filter cartridges with tops on.



Inside cartridges showing media filters ready for replacement.

C. Place the vacuum hose over each individual media filter to suck out filter media.



Vacuuming out of media filters.

D. Once filter media has been sucked use a pressure washer to spray down inside of the cartridge and it's containing media cages. Remove cleaned media cages and place to the side. Once removed the vacuum hose can be inserted into the cartridge to vacuum out any remaining material near the bottom of the cartridge.



E. Reinstall media cages and fill with new media from manufacturer or outside supplier. Manufacturer will provide specification of media and sources to purchase. Utilize the manufacture provided refilling trey and place on top of cartridge. Fill trey with new bulk media and shake down into place. Using your hands slightly compact media into each filter cage. Once cages are full removed refilling trey and replace cartridge top ensuring bolts are properly tightened.







Refilling trey for media replacement.

Refilling trey on cartridge with bulk media.

- F. Exit pre-treatment chamber. Replace access hatch or manhole cover.
- 3. Biofiltration Chamber (middle vegetated chamber)
 - A. In general, the biofiltration chamber is maintenance free with the exception of maintaining the vegetation. Using standard gardening tools properly trim back the vegetation to healthy levels. The MWS Linear utilizes vegetation similar to surrounding landscape areas therefore trim vegetation to match surrounding vegetation. If any plants have died replace plants with new ones:





www.modularwetlands.com



- 4. Discharge Chamber (contains drain down cartridge & connected to pipe)
 - A. Remove access hatch or manhole cover over discharge chamber.
 - B. Enter chamber to gain access to the drain down filter. Unlock the locking mechanism and left up drain down filter housing to remove used BioMediaGREEN filter block as shown below:





C. Insert new BioMediaGREEN filter block and lock drain down filter housing back in place.

Replace access hatch or manhole cover over discharge chamber.



Inspection Notes

- Following maintenance and/or inspection, it is recommended the maintenance operator prepare a maintenance/inspection record. The record should include any maintenance activities performed, amount and description of debris collected, and condition of the system and its various filter mechanisms.
- 2. The owner should keep maintenance/inspection record(s) for a minimum of five years from the date of maintenance. These records should be made available to the governing municipality for inspection upon request at any time.
- 3. Transport all debris, trash, organics and sediments to approved facility for disposal in accordance with local and state requirements.
- 4. Entry into chambers may require confined space training based on state and local regulations.
- 5. No fertilizer shall be used in the Biofiltration Chamber.
- 6. Irrigation should be provided as recommended by manufacturer and/or landscape architect. Amount of irrigation required is dependent on plant species. Some plants may not require irrigation after initial establishment.



Inspection Form



Modular Wetland System, Inc.

P. 760.433-7640

F. 760-433-3176

E. Info@modularwetlands.com

www.modularwetlands.com



Inspection Report Modular Wetlands System



Project Name					For Office Use Onl	у			
roject Address									
Owner / Management Company (city) (Zip Code) (Reviewed By)									
Contact	(Date) Office personnel to complete secti								
Inspector Name				Date	/		Time		AM / PM
Type of Inspection Routin	e 🗌 Fo	ollow Up	☐ Compla	nint	S	Storm Event	in Last 72-ho	urs? 🗌 No 🗌 Y	'es
Weather Condition				Additional N	lotes				
			lr	nspection Chec	klist				
Modular Wetland System T	ype (Curb,	Grate or L	JG Vault):		Size (2	2', 14' or 6	etc.):		
Structural Integrity:						Yes	No	Comme	nts
Damage to pre-treatment access pressure?	cover (manh	ole cover/gr	ate) or cannot	be opened using norn	nal lifting				
Damage to discharge chamber a pressure?	ccess cover (manhole co	ver/grate) or c	annot be opened using	normal lifting				
Does the MWS unit show signs o	f structural d	eterioration	(cracks in the	wall, damage to frame)?				
Is the inlet/outlet pipe or drain do	wn pipe dama	aged or othe	erwise not func	tioning properly?					
Working Condition:									
Is there evidence of illicit discharge or excessive oil, grease, or other automobile fluids entering and clogging the unit?									
s there standing water in inappropriate areas after a dry period?									
Is the filter insert (if applicable) at capacity and/or is there an accumulation of debris/trash on the shelf system?									
Does the depth of sediment/trash/debris suggest a blockage of the inflow pipe, bypass or cartridge filter? If yes specify which one in the comments section. Note depth of accumulation in in pre-treatment chamber.					Depth:				
Does the cartridge filter media need replacement in pre-treatment chamber and/or discharge chamber? Chamber:									
Any signs of improper functioning	in the discha	arge chambe	er? Note issue	es in comments section	1.				
Other Inspection Items:									
Is there an accumulation of sedin	nent/trash/del	bris in the w	etland media (if applicable)?					
Is it evident that the plants are ali	ve and health	ny (if applica	ıble)? Please r	note Plant Information	pelow.				
Is there a septic or foul odor com	ing from insid	le the syster	m?						
Waste:	Yes	No		Recommen	ded Maintena	ince		Plant Inforn	nation
Sediment / Silt / Clay			1	No Cleaning Needed				Damage to Plants	
Trash / Bags / Bottles				Schedule Maintenance	as Planned			Plant Replacement	
Sreen Waste / Leaves / Foliage Needs Immediate Maintenance Plant Trimming									
Additional Notes:									



Maintenance Report



Modular Wetland System, Inc.

P. 760.433-7640

F. 760-433-3176

E. Info@modularwetlands.com

www.modularwetlands.com



Cleaning and Maintenance Report Modular Wetlands System



Project N	ame						Fo	or Office Use Only
Project A	ddress				(city)	(Zip Code)		eviewed By)
Owner / N	Management Company						(D:	ate)
Contact				Phone ()	_	O	office personnel to complete section to the left.
Inspector	Name			Date	/		Time	AM / PM
Type of I	nspection	ne 🔲 Follow Up	☐ Complaint	☐ Storm		Storm Event in	Last 72-hours?	☐ No ☐ Yes
Weather	Condition			Additiona	Notes			
Site Map #	GPS Coordinates of Insert	Manufacturer / Description / Sizing	Trash Accumulation	Foliage Accumulation	Sediment Accumulation	Total Debris Accumulation	Condition of Me 25/50/75/100 (will be change @ 75%)) Manufactures'
	Lat:	MWS Catch Basins						
		MWS Sedimentation Basin						
		Media Filter Condition						
		- Plant Condition						
		Drain Down Media Condition						
		Discharge Chamber Condition						
		Drain Down Pipe Condition						
		Inlet and Outlet Pipe Condition						
Commen	ts:							



Isolator® Row O&M Manual









THE ISOLATOR® ROW

INTRODUCTION

An important component of any Stormwater Pollution Prevention Plan is inspection and maintenance. The StormTech Isolator Row is a technique to inexpensively enhance Total Suspended Solids (TSS) removal and provide easy access for inspection and maintenance.

THE ISOLATOR ROW

The Isolator Row is a row of StormTech chambers, either SC-160LP, SC-310, SC-310-3, SC-740, DC-780, MC-3500 or MC-4500 models, that is surrounded with filter fabric and connected to a closely located manhole for easy access. The fabric-wrapped chambers provide for settling and filtration of sediment as storm water rises in the Isolator Row and ultimately passes through the filter fabric. The open bottom chambers and perforated sidewalls (SC-310, SC- 310-3 and SC-740 models) allow storm water to flow both vertically and horizontally out of the chambers. Sediments are captured in the Isolator Row protecting the storage areas of the adjacent stone and chambers from sediment accumulation.

Two different fabrics are used for the Isolator Row. A woven geotextile fabric is placed between the stone and the Isolator Row chambers. The tough geotextile provides a media for storm water filtration and provides a durable surface for maintenance operations. It is also designed to prevent scour of the underlying stone and remain intact during high pressure jetting. A non-woven fabric is placed over the chambers to provide a filter media for flows passing through the perforations in the sidewall of the chamber. The non-woven fabric is not required over the SC-160LP, DC-780, MC-3500 or MC-4500 models as these chambers do not have perforated side walls.

The Isolator Row is typically designed to capture the "first flush" and offers the versatility to be sized on a volume basis or flow rate basis. An upstream manhole not only provides access to the Isolator Row but typically includes a high flow weir such that storm water flowrates or volumes that exceed the capacity of the Isolator Row overtop the over flow weir and discharge through a manifold to the other chambers.

The Isolator Row may also be part of a treatment train. By treating storm water prior to entry into the chamber system, the service life can be extended and pollutants such as hydrocarbons can be captured. Pre-treatment best management practices can be as simple as deep sump catch basins, oil-water separators or can be innovative storm water treatment devices. The design of the treatment train and selection of pretreatment devices by the design engineer is often driven by regulatory requirements. Whether pretreatment is used or not, the Isolator Row is recommended by StormTech as an effective means to minimize maintenance requirements and maintenance costs.

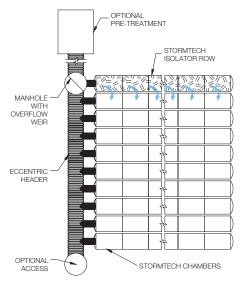
Note: See the StormTech Design Manual for detailed information on designing inlets for a StormTech system, including the Isolator Row.



Looking down the Isolator Row from the manhole opening, woven geotextile is shown between the chamber and stone base.



StormTech Isolator Row with Overflow Spillway (not to scale)





ISOLATOR ROW INSPECTION/MAINTENANCE

INSPECTION

The frequency of inspection and maintenance varies by location. A routine inspection schedule needs to be established for each individual location based upon site specific variables. The type of land use (i.e. industrial, commercial, residential), anticipated pollutant load, percent imperviousness, climate, etc. all play a critical role in determining the actual frequency of inspection and maintenance practices.

At a minimum, StormTech recommends annual inspections. Initially, the Isolator Row should be inspected every 6 months for the first year of operation. For subsequent years, the inspection should be adjusted based upon previous observation of sediment deposition.

The Isolator Row incorporates a combination of standard manhole(s) and strategically located inspection ports (as needed). The inspection ports allow for easy access to the system from the surface, eliminating the need to perform a confined space entry for inspection purposes.

If upon visual inspection it is found that sediment has accumulated, a stadia rod should be inserted to determine the depth of sediment. When the average depth of sediment exceeds 3 inches throughout the length of the Isolator Row, clean-out should be performed.

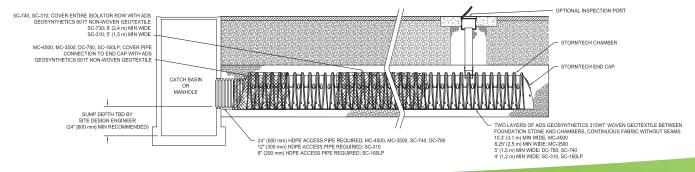
MAINTENANCE

The Isolator Row was designed to reduce the cost of periodic maintenance. By "isolating" sediments to just one row, costs are dramatically reduced by eliminating the need to clean out each row of the entire storage bed. If inspection indicates the potential need for maintenance, access is provided via a manhole(s) located on the end(s) of the row for cleanout. If entry into the manhole is required, please follow local and OSHA rules for a confined space entries.

Maintenance is accomplished with the JetVac process. The JetVac process utilizes a high pressure water nozzle to propel itself down the Isolator Row while scouring and suspending sediments. As the nozzle is retrieved, the captured pollutants are flushed back into the manhole for vacuuming. Most sewer and pipe maintenance companies have vacuum/JetVac combination vehicles. Selection of an appropriate JetVac nozzle will improve maintenance efficiency. Fixed nozzles designed for culverts or large diameter pipe cleaning are preferable. Rear facing jets with an effective spread of at least 45" are best. Most JetVac reels have 400 feet of hose allowing maintenance of an Isolator Row up to 50 chambers long. The JetVac process shall only be performed on StormTech Isolator Rows that have AASHTO class 1 woven geotextile (as specified by StormTech) over their angular base stone.

StormTech Isolator Row (not to scale)

Note: Non-woven fabric is only required over the inlet pipe connection into the end cap for SC-160LP, DC-780, MC-3500 and MC-4500 chamber models and is not required over the entire Isolator Row.





ISOLATOR ROW STEP BY STEP MAINTENANCE PROCEDURES

STEP 1

Inspect Isolator Row for sediment.

- A) Inspection ports (if present)
 - i. Remove lid from floor box frame
 - ii. Remove cap from inspection riser
 - iii. Using a flashlight and stadia rod, measure depth of sediment and record results on maintenance log.
 - iv. If sediment is at or above 3 inch depth, proceed to Step 2. If not, proceed to Step 3.
- B) All Isolator Rows
 - i. Remove cover from manhole at upstream end of Isolator Row
 - ii. Using a flashlight, inspect down Isolator Row through outlet pipe
 - 1. Mirrors on poles or cameras may be used to avoid a confined space entry
 - 2. Follow OSHA regulations for confined space entry if entering manhole
 - iii. If sediment is at or above the lower row of sidewall holes (approximately 3 inches), proceed to Step 2. If not, proceed to Step 3.

STEP 2

Clean out Isolator Row using the JetVac process.

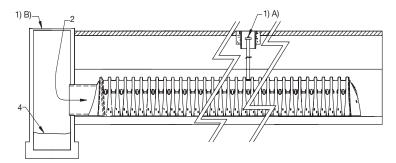
- A) A fixed floor cleaning nozzle with rear facing nozzle spread of 45 inches or more is preferable
- B) Apply multiple passes of JetVac until backflush water is clean
- C) Vacuum manhole sump as required

STEP 3

Replace all caps, lids and covers, record observations and actions.

STEP 4

Inspect & clean catch basins and manholes upstream of the StormTech system.



SAMPLE MAINTENANCE LOG

	Stadia Rod Readings		Sediment Depth		
Date	Fixed point to chamber bottom (1)	Fixed point to top of sediment (2)	(1)-(2)	Observations/Actions	Inspector
3/15/11	6.3 ft	none		New installation. Fixed point is CI frame at grade	MCG
9/24/11		6.2	0.1 ft	Some grit felt	SM
6/20/13		5,8	0.5 ft	Mucky feel, debris visible in manhole and in Isolator Row, maintenance due	νν
7/7/13	6.3 ft		0	System jetted and vacuumed	MCG





Project Name:

Attachment 4 Copy of Plan Sheets Showing Permanent Storm Water BMPs

This is the cover sheet for Attachment 4.



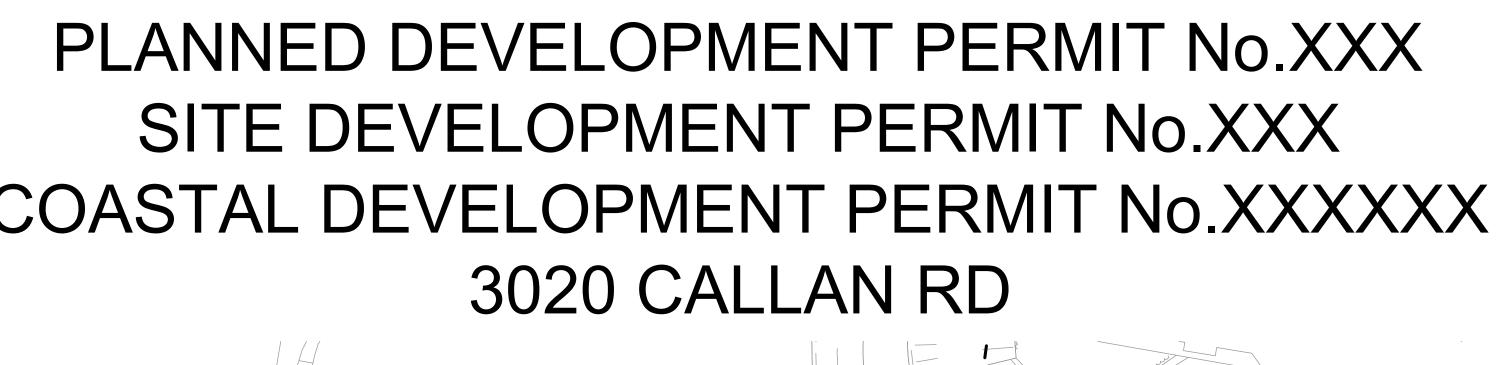
Project Name:

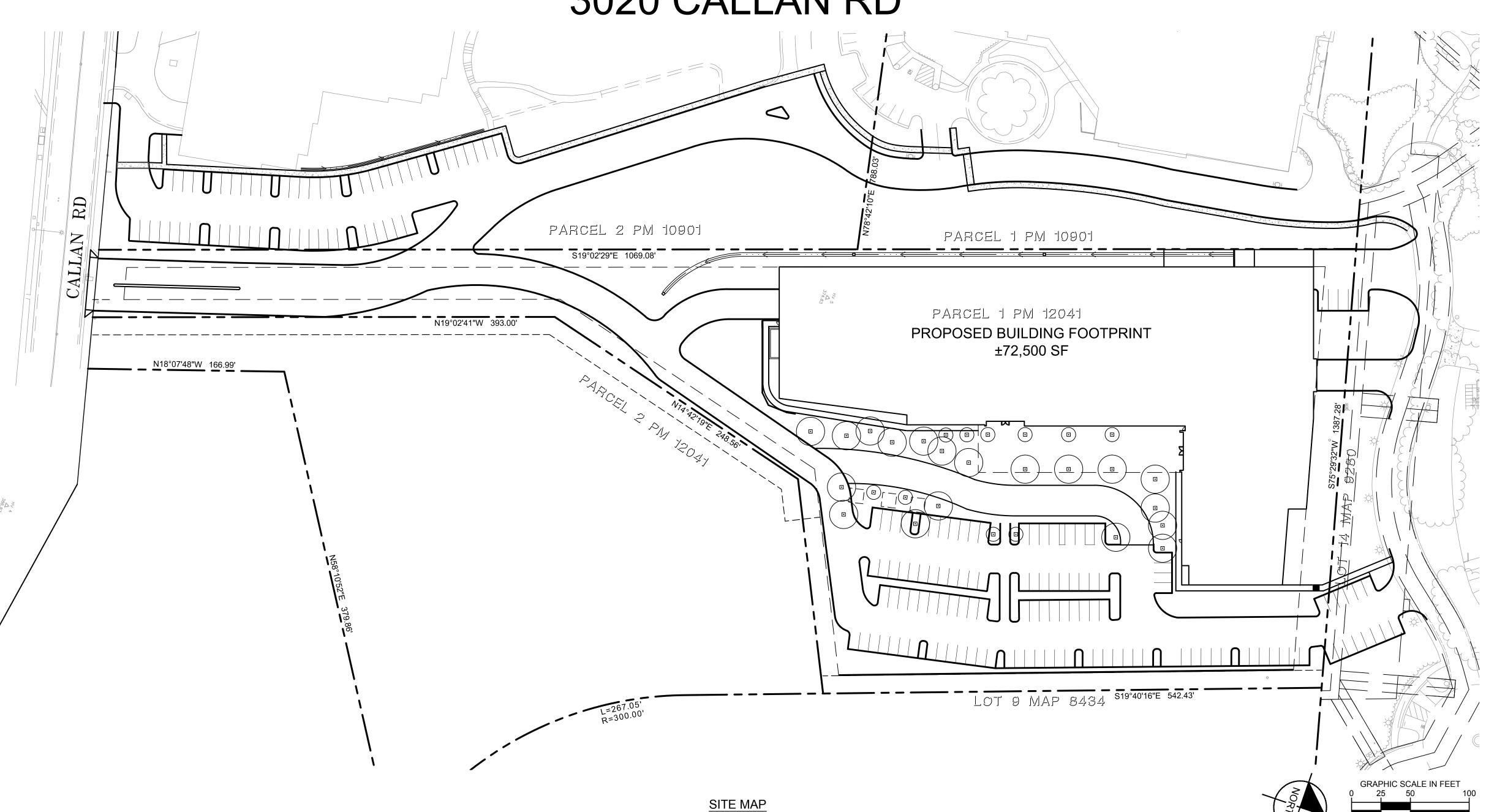
Use this checklist to ensure the required information has been included on the plans:

Th	e plans must identify:
	Structural BMP(s) with ID numbers matching Form I-6 Summary of PDP Structural BMPs
	The grading and drainage design shown on the plans must be consistent with the
	delineation of DMAs shown on the DMA exhibit
	Details and specifications for construction of structural BMP(s)
	Signage indicating the location and boundary of structural BMP(s) as required by the
	City Engineer
	How to access the structural BMP(s) to inspect and perform maintenance
	Features that are provided to facilitate inspection (e.g., observation ports, cleanouts, silt
	posts, or other features that allow the inspector to view necessary components of
	the structural BMP and compare to maintenance thresholds)
	Manufacturer and part number for proprietary parts of structural BMP(s) when
	applicable
	Maintenance thresholds specific to the structural BMP(s), with a location-specific frame
	of reference (e.g., level of accumulated materials that triggers removal of the
	materials, to be identified based on viewing marks on silt posts or measured with a
_	survey rod with respect to a fixed benchmark within the BMP)
	Recommended equipment to perform maintenance
	When applicable, necessary special training or certification requirements for inspection
	and maintenance personnel such as confined space entry or hazardous waste
	management
	Include landscaping plan sheets showing vegetation requirements for vegetated
_	structural BMP(s)
	All BMPs must be fully dimensioned on the plans
	When proprietary BMPs are used, site specific cross section with outflow, inflow
	and model number shall be provided. Broucher photocopies are not allowed.



PLANNED DEVELOPMENT PERMIT No.XXX SITE DEVELOPMENT PERMIT No.XXX COASTAL DEVELOPMENT PERMIT No.XXXXXX





LEGAL DESCRIPTION

PARCEL 1 OF PARCEL MAP NO. 12041, IN THE CITY OF SAN DIEGO, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, APRIL 2, 1982 AS FILE NO. 82-090385 OF OFFICIAL RECORDS.

BASIS OF BEARING

THE BASIS OF BEARINGS FOR THIS SURVEY IS A PORTION OF THE EASTERLY LINE OF PARCEL 1, PARCEL MAP 13041, I.E. N 14°42'10E

BENCHMARK

THE BENCHMARK FOR THIS SURVEY IS CITY OF SAN DIEGO BENCHMARK BRASS PLUG AT SOUTHERLY ENTRANCE PF SCRIPPS CLINIC ON NORTH TORREY PINES ROAD. ELEVATION: 441.10 FEET DATUM: NGVD 29

ASSESSOR'S PARCEL NUMBER

340-010-44-00

SOURCE OF TOPOGRAPHY PHOTO GEODETIC CORPORATION

PROJECT No.510519, DATED 11/14/2019 1161 EAST MAIN ST, EL CAJON, CA 92021 PHONE: 619-631-1366

REFERENCE DRAWINGS

1. CITY OF SAN DIEGO STANDARD DRAWINGS, ENGINEERING DIVISION STANDARD PLANS, DATED 2. CITY OF SAN DIEGO DRAWING: MAP No. 9230 P.M. No. 21041 P.M. NO. 10901 P.M. NO. 9280

ZONE DESIGNATIONS INDUSTRIAL EMPLOYMENT

ABBREVIATIONS:

HIGH POINT

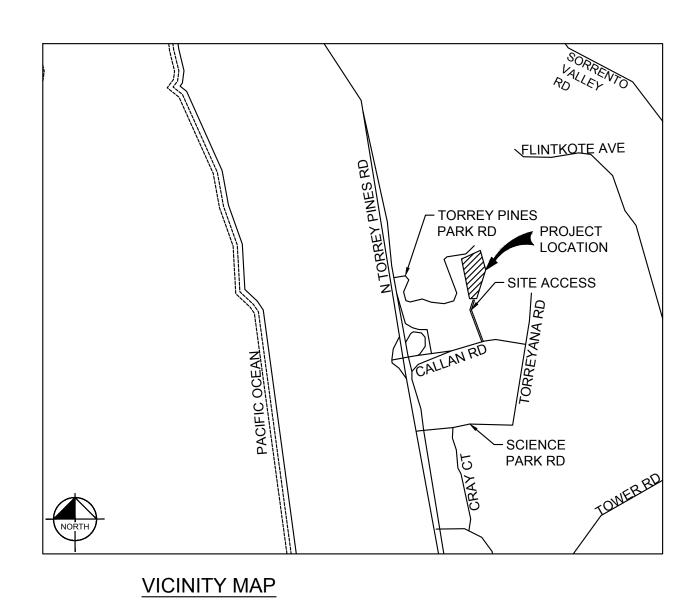
ADDICE VIA HONG.				
AC.	ACRES	ΙE	INVERT	
APN	ASSESSOR'S PARCEL NUMBER	LP	LOW POINT	
BLDG	BUILDING	MH	MANHOLE	
BOT	BOTTOM OF PIPE	N.T.S.NC	OT TO SCALE	
CB	CATCH BASIN	PC	POINT OF CURVATURE	
CIP	CAST-IN-PLACE	PPD	PRECISE PLAN OF DESIGN	
CMU	CONCRETE MASONRY UNIT	PROP	PROPOSED	
EG	EXISTING GRADE	RL	RIDGE LINE	
EP	EDGE OF PAVEMENT	RG	ROUGH GRADED	
ESCP	EROSION SEDIMENT CONTROL	ROS	RECORD OF SURVEY	
	PLAN	RS	RECORD SURVEY	
ESMT.	EASEMENT	R/W	RIGHT-OF-WAY	
EX	EXISTING	SF	SQUARE FEET	
FF	FINISHED FLOOR ELEVATION	SWLK	SIDEWALK	
FG	FINISHED GRADE	TC	TOP OF CURB	
FH	FIRE HYDRANT	TG	TOP OF GRATE	
FL	FLOW LINE	T0P	TOP OF PIPE	
FS	FINISHED SURFACE	TP	TOP OF PAVEMENT	
FW	FIRE WATER	TW	TOP OF WALL	
GB	GRADE BREAK	TVP	TYPICAL	

<u>LEGEND</u>

LANDSCAPE

PROPERTY LINE / RIGHT-OF-WAY CENTERLINE SETBACK EASEMENT LIMITS OF DEMOLITION BUILDING DEMOLITION AREA LANDSCAPE REMOVAL CONCRETE REMOVAL PAVEMENT REMOVAL EXISTING STORM DRAIN EXISTING SEWER EXISTING WATER FENCE CHAINLINK RETAINING WALL ASPHALT PAVEMENT CONCRETE PAVEMENT (18" BASE) CONCRETE SIDEWALK

PARKING COUNT



OWNER/DEVELOPER:

HEALTHPEAK PROPERTIES, INC. 420 STEVENS AVENUE, SUITE 170 SOLANA BEACH, CA 92075

ARCHITECT:

SAN DEIGO, CA 92123

PH: (619) 231-0751

FERGUSON PAPE BALDWIN ARCHITECTS

4499 RUFFIN ROAD, SUITE 300

GEOTECHNICAL ENGINEER

GEOCON INCORPORATED 6960 FLANDERS DRIVE SAN DIEGO, CA 92121 PH: (858)558-6900 FAX:(858)558-6159 REPORT NO.: G2469-11-01 DATED: 12/13/2019 & 12/16/2019

S	SHEET INDEX		
SHEET#	TITLE		
C1.0	COVER SHEET		
C2.0	DEMOLITION PLAN		
C3.0	SITE IMPROVEMENTS PLAN		
C4.0	GRADING PLAN		
C5.0	GRADING CROSS SECTIONS		
C6.0	UTILITY PLAN		
C7.0	STORMDRAIN AND BMP PLAN		
C8.0	EROSION CONTROL PLAN		

DECLARATION OF RESPONSIBLE CHARGE

I HEREBY DECLARE THAT I AM THE ENGINEER OF WORK FOR THIS PROJECT, THAT I HAVE EXERCISED RESPONSIBLE CHARGE OVER THE DESIGN OF THE PROJECT AS DEFINED IN SECTION 6703 OF THE BUSINESS AND PROFESSIONS CODE, AND THAT THE DESIGN IS CONSISTENT WITH CURRENT STANDARDS. I UNDERSTAND THAT THE CHECK OF PROJECT DRAWINGS AND SPECIFICATIONS BY THE CITY OF RIALTO IS CONFINED TO A REVIEW ONLY AND DOES NOT RELIEVE ME, AS ENGINEER OF WORK, OF MY RESPONSIBILITIES FOR PROJECT DESIGN.

TAMMIE MORENO R.C.E. 74417

ORIGINAL PREPARATION DATE: FEBRUARY 10, 2020

MUP PROJECT #:

PREPARED BY:	FERGUSON PAPE BALDWIN ARCHITECTS
ADDRESS:	4499 RUFFIN RD. #300 SAN DIEGO, CA 92123
PHONE NO #:	(619) 231-0751 / PHIL PAPE
PROJECT ADDRESS:	3020 & 3030 CALLAN RD
	SAN DIEGO, CA 92121 3020 CALLAN ROAD NEW BUILDINGS
PROJECT NAME: SHEET TITLE:	
COVER SHEET	

SHEET: **2** OF **54**

FERGUSON

BALDWIN

ARCHITECTS

PAPE

4499 Ruffin Road San Diego CA 92123 www.fpbarch.com

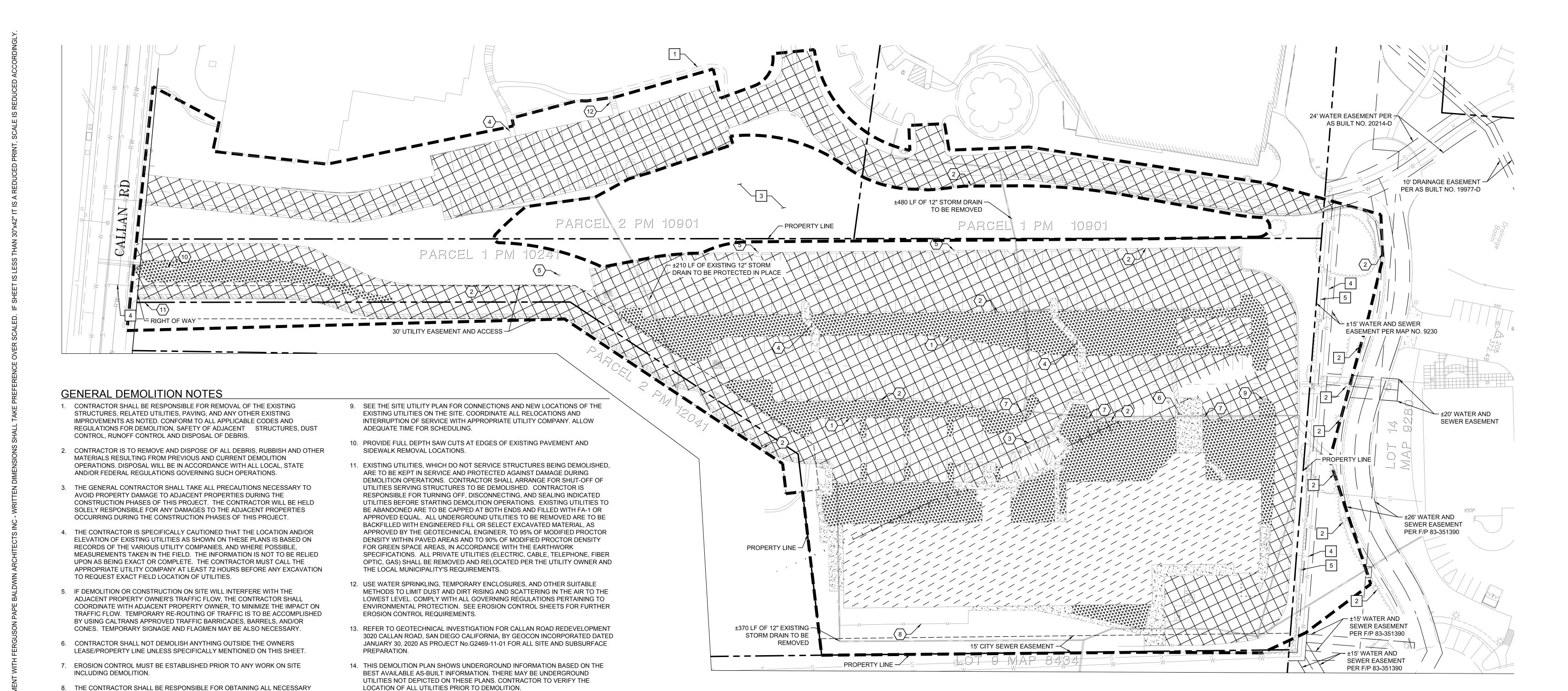


DESCRIPTION NO. DATE CHEMATIC DESIGN / A 01/31/2020 EVELOPMENT ERMIT DRAFT EVELOPMENT B 2/10/2020 ERMIT SUBMITTAL

COVER SHEET

DESCRIPTION NO. DATE SCHEMATIC DESIGN / A 01/31/2020 DEVELOPMENT PERMIT DRAFT DEVELOPMENT B 2/10/2020 PERMIT SUBMITTAL

DEMOLITION PLAN



DEMOLITION NOTES

- 1 EXISTING CURB TO BE REMOVED
- 2 EXISTING CURB AND GUTTER TO BE REMOVED

PERMITS REQUIRED FOR DEMOLITION, PAYING ALL SPECIFIED FEES.

- 3 EXISTING RIBBON GUTTER TO BE REMOVED 4 EXISTING CONCRETE WALK TO BE REMOVED
- 5 EXISTING LIGHTING TO BE REMOVED
- 6 EXISTING FIRE HYDRANT TO BE REMOVED
- 7 EXISTING STORM DRAIN INLET TO BE REMOVED
- 8 EXISTING FENCE TO BE REMOVED (9) EXISTING STAMPED CONCRETE TO BE REMOVED
- (10) EXISTING MONUMENT SIGN TO BE RELOCATED
- 11 EXISTING SIGN TO BE RELOCATED
- (12) EXISTING STAIRS TO BE REMOVED

PROTECTION NOTES

- 1 PROTECT IN PLACE EXISTING GUTTER
- 2 PROTECT IN PLACE EXISTING LIGHT
- 3 | PROTECT IN PLACE EXISTING TREES
- 4 PROTECT IN PLACE EXISTING WATER LINE
- 5 PROTECT IN PLACE EXISTING SEWER LINE

<u>LEGEND</u>

PROPERTY LINE / RIGHT-OF-WAY CENTERLINE

EASEMENT LIMITS OF DEMOLITION

BUILDING DEMOLITION AREA LANDSCAPE REMOVAL

CONCRETE REMOVAL PAVEMENT REMOVAL

EXISTING STORM DRAIN

EXISTING SEWER EXISTING WATER

FENCE CHAINLINK RETAINING WALL

////////// ____ _____S_____S____ PREPARED BY: FERGUSON PAPE BALDWIN ARCHITECTS ADDRESS: 4499 RUFFIN RD. #300 SAN DIEGO, CA 92123 PHONE NO #: (619) 231-0751 / PHIL PAPE PROJECT ADDRESS: 3020 & 3030 CALLAN RD SAN DIEGO, CA 92121 3020 CALLAN ROAD NEW BUILDINGS PROJECT NAME: SHEET TITLE:

DEMOLITION PLAN

ORIGINAL PREPARATION DATE: FEBRUARY 10, 2020

MUP PROJECT #:

DEP #: _____

SHEET: 3 OF 54

C2.0

PROPERTY LINE -

15' CITY SEWER EASEMENT

LOT 9 MAP 8434

S19°40'16"E 542.43'

SEWER EASEMENT

SITE IMPROVEMENTS NOTES

6" CURB PER CITY OF SAN DIEGO STD DWG SDG-150

6" CURB AND GUTTER CITY OF SAN DIEGO STD DWG SDG-150

CURB RAMP CITY OF SAN DIEGO STD DWG SDG-133

5' WIDE SIDEWALK CITY OF SAN DIEGO STD DWG SDG-155

CONSTRUCT ROLLED CURB PER DETAIL XXX

6 INSTALL LANDSCAPING

PROP. PARKING STALL STRIPING. SEE ARCH. PLANS FOR DETAILS

PROP. ADA STRIPING. SEE ARCH. PLANS FOR DETAILS

BUILDING OVERHANG. SEE ARCH. PLANS FOR DETAILS

CONSTRUCT CONCRETE DRIVEWAY. PAVEMENT SECTION PER GEOTECH REPORT BY GEOCON. DATED 12/13/19

CONSTRUCT ASPHALT CONCRETE DRIVEWAY. PAVEMENT SECTION PER GEOTECH REPORT BY GEOCON. DATED 12/13/19

RETAINING WALL DESIGNED BY OTHERS

PROPOSED TREE. SEE ARCH PLANS FOR DETAILS

CONSTRUCT CONCRETE DRIVEWAY CITY OF SAN DIEGO STD DWG SDG 163.

NOTES

1. ALL DIMENSIONS ARE TO FACE OF CURB UNLESS OTHERWISE NOTED.

2. ALL DRIVER AUTO AND OFFICE PARKING (INCLUDING ADA AND CARPOOL) STALLS ARE 8.5' WIDE x 18' DEEP UNLESS OTHERWISE NOTED.

<u>LEGEND</u>

PROPERTY LINE / RIGHT-OF-WAY CENTERLINE SETBACK EASEMENT EXISTING STORM DRAIN FENCE CHAINLINK RETAINING WALL

ASPHALT PAVEMENT

CONCRETE PAVEMENT (18" BASE)

CONCRETE SIDEWALK

ENVIRONMENTALLY SENSITIVE LAND

PARKING COUNT

LANDSCAPE

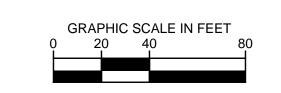
(XX)



MUP PROJECT #: __

DEP #: _____

SEWER EASEMENT PER F/P 83-351390



PREPARED BY:

ADDRESS:

4499 RUFFIN RD. #300
SAN DIEGO, CA 92123

PHONE NO #:

(619) 231-0751 / PHIL PAPE

PROJECT ADDRESS:

3020 & 3030 CALLAN RD
SAN DIEGO, CA 92121

PROJECT NAME:

3020 CALLAN ROAD NEW BUILDINGS

SHEET TITLE:

SITE IMPROVEMENTS PLAN

ORIGINAL PREPARATION DATE: FEBRUARY 10, 2020

SHEET: 4 OF 54

__37

FERGUSON
PAPE
BALDWIN
ARCHITECTS

4499 Ruffin Road Suite 300 San Diego CA 92123 619 231 0751 www.fpbarch.com



WWW.KIMLEY-HORN.COM

CIVIL

CIVIL

COF CALIFORM

CIVIL

CIVIL

COF CALIFORM

CIVIL

CI

JILDINGS

IEALTHPEAK PROPERTIES, 020 CALLAN ROAD NEW BU

DESCRIPTION NO. DATE

SCHEMATIC DESIGN / DEVELOPMENT
PERMIT DRAFT

DEVELOPMENT
PERMIT SUBMITTAL

B 2/10/2020

SITE IMPROVEMENTS PLAN

C3.0

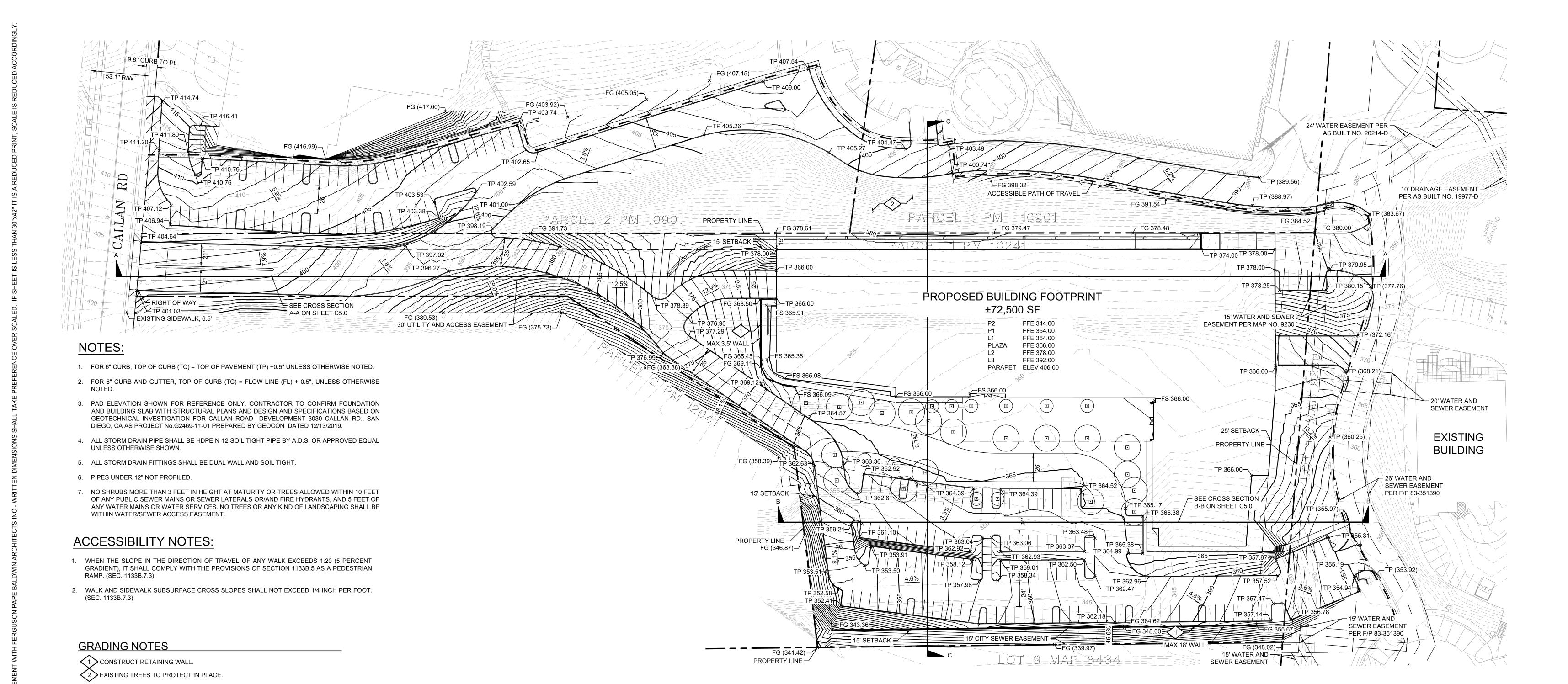
DEVELOPMENT
PERMIT DRAFT

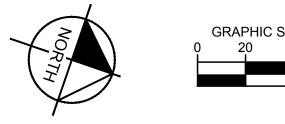
DEVELOPMENT
PERMIT SUBMITTAL

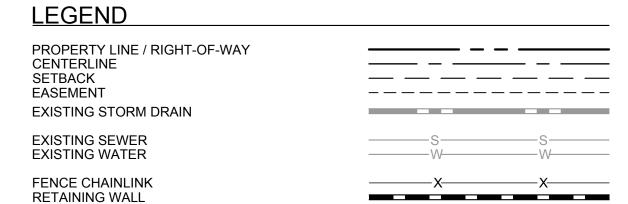
B 2/10/2020

GRADING PLAN

C4 (







ACCESSIBLE PATH OF TRAVEL

EARTHWORK QUANTITIES

TOTAL SITE AREA: 7.05 ACRES
TOTAL AMOUNT OF CUT: 52,500 CYD
MAXIMUM DEPTH OF CUT: 15FT
TOTAL AMOUNT OF FILL: 46,800 CYD
MAXIMUM DEPTH OF FILL: 21FT
NET: 5,700 CYD (CUT/EXPORT)
MAXIMUM HEIGHT OF FILL SLOPE(S): 6FT, 2:1% SLOPE RATIO
MAXIMUM HEIGHT OF CUT SLOPE(S): 0FT, N/A SLOPE RATIO

TOTAL RETAINING WALL LENGTH: 450FT MAXIMUM HEIGHT OF WALL(S): 18FT

TOTAL AREA LESS THAN 25% SLOPE: 6.14 ACRES TOTAL AREA GREATER THAN 25% SLOPE: 0.91 ACRES

THE ABOVE LISTED QUANTITIES REFLECT THE ENGINEERS ESTIMATE OF THE ACTUAL VOLUMES OF MATERIAL CUT AND FILLED. THESE QUANTITIES ARE FOR ESTIMATING AND BONDING PURPOSES ONLY. SHRINKAGE, SUBSIDENCE AND ANY REMOVALS ARE BASED ON FIELD DATA OBTAINED FROM THE SOILS ENGINEER AND ACTUAL CONDITIONS DURING CONSTRUCTION MAY VARY.

PREPARED BY:

ADDRESS:

4499 RUFFIN RD. #300
SAN DIEGO, CA 92123

PHONE NO #:

(619) 231-0751 / PHIL PAPE

PROJECT ADDRESS:

3020 & 3030 CALLAN RD
SAN DIEGO, CA 92121

PROJECT NAME:

3020 CALLAN ROAD NEW BUILDINGS

SHEET TITLE:

GRADING PLAN

SHEET: <u>5</u> OF <u>54</u>

ORIGINAL PREPARATION DATE: FEBRUARY 10, 2020

MUP PROJECT #:

DEP #: _____

PREPARED BY: FERGUSON PAPE BALDWIN ARCHITECTS

ADDRESS: 4499 RUFFIN RD. #300

336

334

4499 RUFFIN RD. #300 SAN DIEGO, CA 92123

PHONE NO #: (619) 231-0751 / PHIL PAPE

PROJECT ADDRESS: 3020 & 3030 CALLAN RD SAN DIEGO, CA 92121

/-ELEV:406.00

PROPERTY LINE

PROJECT NAME: 3020 CALLAN ROAD NEW BUILDINGS

SHEET TITLE:

EXISTING SURFACE

__ELEV:344.00

CROSS SECTION C-C

SCALE: H:1"=40', V:1"=10'

GRADING CROSS SECTIONS

ORIGINAL PREPARATION DATE: FEBRUARY 10, 2020

MUP PROJECT #: ______

DEP #: _____ SHEET: _6 ___ OF _54

C5.0

SECTIONS

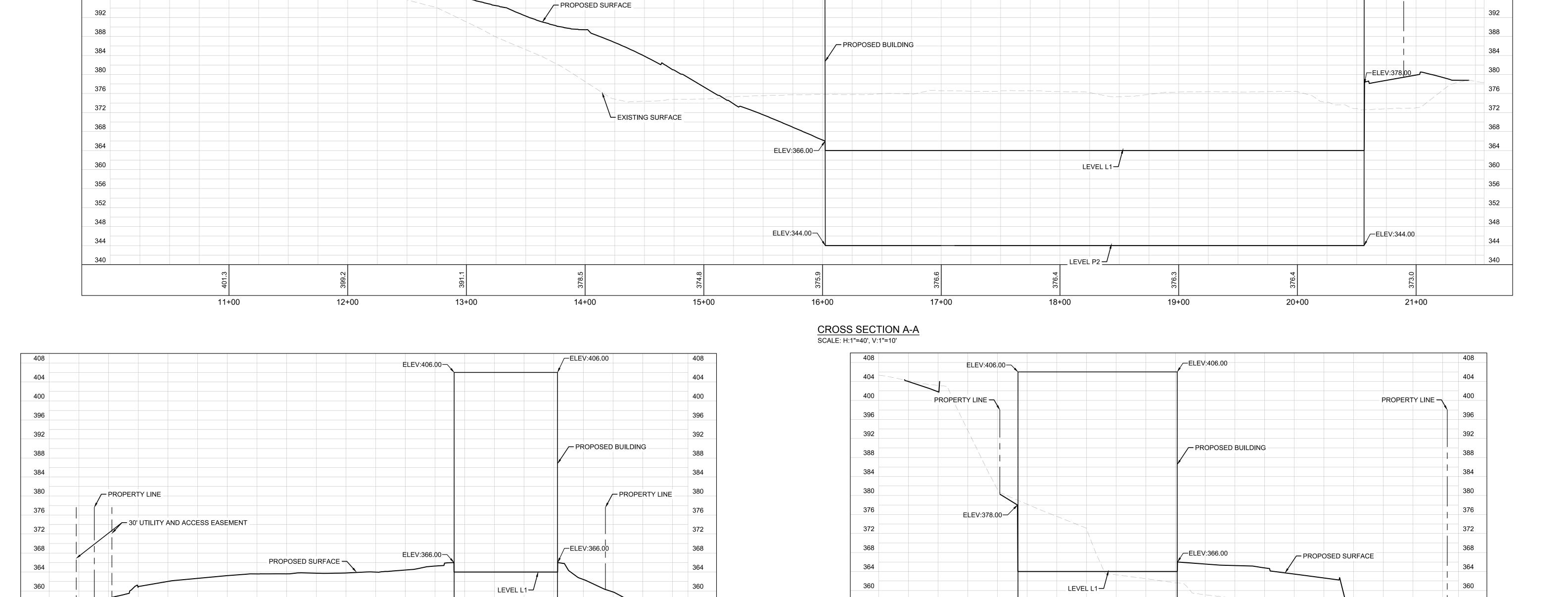
GRADING CROSS

DESCRIPTION NO. DATE

SCHEMATIC DESIGN / A 01/31/2020 DEVELOPMENT PERMIT DRAFT

DEVELOPMENT

PERMIT SUBMITTAL



_ELEV:344.00

15+00

348

344

334

ELEV:344.00—

11+00

LEVEL P2

ELEV:406.00-

PROPERTY LINE

356

352

EXISTING SURFACE

11+00

12+00

CROSS SECTION B-B SCALE: H:1"=40', V:1"=10' ELEV:344.00-

13+00

LEVEL P2

14+00

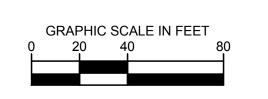
UTILITY PLAN

C6.0

EX. 4" RECYCLED WATER CITY OF SAN DIEGO DWG. 27357-D 24' WATER EASEMENT PER -AS BUILT NO. 20214-D EX. FIRE HYDRANT EX. 12" ACP WATER CITY OF SAN DIEGO DWG. 17105-D EX. 10" PVC SEWER CITY OF SAN DIEGO DWG. 17105-D 10' DRAINAGE EASEMENT -PER AS BUILT NO. 19977-D CITY OF SAN DIEGO DWG. 17105-D PROPOSED ELECTRIC LINE. -SEE ELECTRICAL PLANS. EX. 12" ACP WATER CITY OF SAN DIEGO DWG. 18319-D ►EX. 10" PVC SEWER CITY OF SAN DIEGO DWG. 18319-D PROPOSED BUILDING FOOTPRINT 15' WATER AND SEWER -EASEMENT PER MAP NO. 9230 30' UTILITY EASEMENT AND ACCESS igspace EXISTING SIDEWALK, 6.5' ±72,500 SF PROP. 4" SEWER = PROP. BUILDING P.O.C. -NOTES: PROP. BUILDING P.O.C. — 1. OFFSITE WATER AND SEWER IS SHOWN FOR REFERENCE ONLY TO SHOW CONNECTIONS TO PUBLIC LATERALS OR MAINS. PROP. BUILDING P.O.C. -2. THE PRIVATE WATER SYSTEM IS DESIGNED IN ACCORDANCE WITH THE CALIFORNIA PLUMBING 20' WATER AND CODE AND IS SHOWN ON THESE PLANS AS 'INFORMATION ONLY.' A SEPARATE PLUMBING PERMIT SEWER EASEMENT IS REQUIRED FOR CONSTRUCTION AND INSPECTION OF THE SYSTEM. 3. THE PRIVATE ON-SITE SEWER SYSTEM WITH WELDED JOINTS AND CLEANOUTS SHALL BE 25' SETBACK — **EXISTING** DESIGNED TO MEET THE STANDARDS OF THE CALIFORNIA PLUMBING CODE. PRIVATE MAINS WITH MANHOLES AND PUSH-ON JOINTS SHALL BE DESIGNED PER THE SEWER DESIGN GUIDE PROPERTY LINE -BUILDING AND WILL MEET STATE SEPARATION REQUIREMENT. 4. 10' MINIMUM HORIZONTAL SEPARATION BETWEEN PROPOSED DOMESTIC WATER AND SANITARY SEWER LINES. 5. ALL WATER CROSSINGS SHOULD HAVE A MINIMUM CLEARANCE OF 12" FROM ANY SEWER OR STORMDRAIN CROSSING. 6. WATER AND FIRE MAINS SHALL BE INSTALLED WITH A MINIMUM 3' VERTICAL CLEARANCE FROM 15' SETBACK — THE TOP OF FINISHED GRADE TO THE TOP OF THE PIPE. SEWER EASEMENT PER F/P 83-351390 7. PRIOR TO CONNECTING TO ANY EXISTING SEWER LATERAL, IT SHALL BE CLOSED CIRCUIT TELEVISION INSPECTED BY A CALIFORNIA LICENSED PLUMBING CONTRACTOR TO VERIFY PROPERTY LINE — LATERAL IS IN GOOD WORKING CONDITION AND FREE OF ALL DEBRIS. 8. ON-SITE ELECTRIC AND COMMUNICATION LINES SERVING THE SITE TO BE PROPOSED BY ELECTRICAL. 9. STUB POINT OF CONNECTION 5' FROM BUILDING. REFER TO MEP PLANS FOR INVERT ELEVATION AND CONTINUATION TO BUILDING. 10. EXCAVATION FOR UTILITY TRENCHES TO BE 2' BELOW DEEPEST UTILITY FLOW LINE/INVERT ELEVATION PER GEOTECHNICAL RECOMMENDATIONS. CONTRACTOR/DEVELOPER TO 15' WATER AND DETERMINE APPROPRIATE DEPTH OF TRENCH FOR SHALLOW UTILITIES ADJACENT TO DEEP EX. 10" PVC SEWER SEWER EASEMENT UTILITIES. CITY OF SAN DIEGO DWG. 19166-D PER F/P 83-351390 CITY OF SAN DIEGO DWG. 19166-D 11. ALL EXISTING UTILITIES SHOWN BASED ON AS-BUILT INFORMATION. CONTRACTOR TO 15' WATER AND EASEMENT PER COORDINATE REMOVAL OF ANY EXISTING WET UTILITIES FOUND DURING CONSTRUCTION. SEWER EASEMENT DWG. 19166-D PER F/P 83-351390 PROPERTY LINE = 12. ALL PLANS FOR PRIVATE FIRE SERVICE MAINS AND PRIVATE FIRE HYDRANTS ARE SHOWN FOR REFERENCE ONLY AND MUST BE SUBMITTED SEPARATELY TO CALIFORNIA AMERICAN WATER AND FIRE PLAN CHECK FOR APPROVAL PRIOR TO INSTALLATION. ALL PRIVATE FIRE SYSTEMS WILL BE DEFINED IN ACCORDANCE WITH CALIFORNIA BUILDING CODE; CALIFORNIA FIRE CODE; AND NFPA 24. PRIVATE FIRE SERVICE MAINS AND THEIR APPURTENANCES. PLANS SHALL BE CAUTION!!! EXISTING UTILITIES SHOWN ARE APPROXIMATE AND HORIZONTAL SINGLE FIRE LINE DRAWINGS SHOWING ALL OF THE APPLICABLE REQUIREMENTS OF THE CODES SPECIFIED ABOVE. AND VERTICAL LOCATIONS SHALL BE FIELD VERIFIED BY THE CONTRACTOR PRIOR TO CONSTRUCTION. CONTRACTOR IS 13. ALL DRY UTILITIES SHOWN FOR REFERENCE ONLY AND MUST BE SUBMITTED SEPARATELY FOR RESPONSIBLE FOR PROTECTING EXISTING UTILITIES. APPROVAL PRIOR TO INSTALLATION. 14. ALL UTILITY CROSSINGS TO BE PER DETAIL ON ON THIS SHEET.

PRIVATE ONSITE WATER AND SEWER ARE DESIGNED IN ACCORDANCE WITH THE CALIFORNIA PLUMBING CODE AND ARE SHOWN ON THE PLANS AS REFERENCE ONLY. A SEPARATE PERMIT IS REQUIRED FOR CONSTRUCTION AND INSPECTION OF THE SYSTEM.





UTILITY NOTES

1 CONNECT TO EXISTING FIRE SERVICE

2 CONNECT TO EXISTING WATER SERVICE

(3) PROP FIRE HYDRANT

4 PROP 6" FIREBACKFLOW

(6) PROP 3" RECYCLED WATER BACKFLOW AND METER

PROPOSED UTILITY AND WATER LINE CROSSING 45° BENDS WITH -THRUST/ANCHOR THRUST/ANCHOR BLOCKING (TYP.) BLOCKING (TYP.) WHERE APPLICABLE WHERE APPLICABLÉ

NOTE: CONTRACTOR MAY AT THEIR OPTION ROPE THE WATER MAIN IN PLACE OF VERTICAL BENDS TO MAINTAIN 1' MIN CLEARANCE. ROPING SHALL NOT EXCEED MAXIMUM RADIUS OF CURVATURE PER MANUFACTURERS RECOMMENDATIONS. THIS DETAIL CAN ONLY BE USED FOR THE PRIVATE ON-SITE UTILITY SYSTEM.

DETAIL A: UTILITY CROSSING NTS

LEGEND	
PROPERTY LINE / RIGHT-OF-WAY CENTERLINE SETBACK EASEMENT	
EXISTING STORM DRAIN EXISTING SEWER EXISTING WATER FENCE CHAINLINK RETAINING WALL	 -S
PROPOSED SEWER PROPOSED WATER PROPOSED RECYCLED WATER PROPOSED ELECTRIC LINE	 S

PREPARED BY: FERGUSON PAPE BALDWIN ARCHITECTS ADDRESS: 4499 RUFFIN RD. #300 SAN DIEGO, CA 92123 PHONE NO #: (619) 231-0751 / PHIL PAPE PROJECT ADDRESS: 3020 & 3030 CALLAN RD SAN DIEGO, CA 92121 3020 CALLAN ROAD NEW BUILDINGS PROJECT NAME: SHEET TITLE: UTILITY PLAN

ORIGINAL PREPARATION DATE: FEBRUARY 10, 2020 MUP PROJECT #:

SHEET: 7 OF 54 DEP #: _____



<u>LEGEND</u>

PROPERTY LINE / RIGHT-OF-WAY
CENTERLINE
SETBACK
EASEMENT
EXISTING STORM DRAIN
FENCE CHAINLINK
RETAINING WALL
PROPOSED STORM DRAIN

EMBEDMENT STONE SHALL BE A CLEAN, CRUSHED AND ANGULAR GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% STONE WITH AN AASHTO M43 DESIGNATION BETWEEN #3 AND #4 FINES, COMPACT IN 12" (300 mm) MAX LIFTS TO 95% PROCTOR DENSITY. SEE THE TABLE OF ACCEPTABLE FILL MATERIALS. CHAMBERS SHALL MEET ASTM F2418 "STANDARD SPECIFICATION FOR POLYPROPELENE (PP) CORRUGATED -CHAMBERS SHALL BE BE DESIGNED IN ACCORDANCE WITH ASTM F2787 WALL STORMWATER COLLECTION CHAMBERS". - "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS". ADS GEOSYTHETICS 601T NON-WOVEN GEOTEXTILE ALL AROUND CLEAN, CRUSHED, -PAVEMENT LAYER (DESIGNED BY SITE DESIGN ENGINEER) ANGULAR EMBEDMENT STONE PERIMETER STONE (600 mm) MIN* 12" (300 mm) MIN **EXCAVATION WALL** (CAN BE SLOPED -OR VERTICAL) (1525 mm) DEPTH OF STONE TO BE DETERMINED
BY SITE DESIGN ENGINEER 9" (230 mm) MIN 12" (300 mm) MIN — END CAP (230 mm) MIN SITE DESIGN ENGINEER IS RESPONSIBLE FOR ENSURING THE REQUIRED BEARING CAPACITY OF SOILS *MINIMUM COVER TO BOTTOM OF FLEXIBLE PAVEMENT. FOR UNPAVED INSTALLATIONS WHERE RUTTING FROM VEHICLES MAY OCCUR, INCREASE COVER TO 30" (750 mm).

PREPARED BY:	FERGUSON PAPE BALDWIN ARCHITECTS		
ADDRESS:	4499 RUFFIN RD. #300 SAN DIEGO, CA 92123		
PHONE NO #:	(619) 231-0751 / PHIL PAPE		
PROJECT ADDRESS:	3020 & 3030 CALLAN RD SAN DIEGO, CA 92121		
PROJECT NAME:	3020 CALLAN ROAD NEW BUILDINGS		
SHEET TITLE: STORMDRAIN AND BMP PLAN			
ORIGINAL PREPARATION DATE: FEBRUARY 10, 2020			
MUP PROJECT #:			
DEP #:	SHEET: 8 OF 54		

IPEAK PROPERTIES, INC. ILLAN ROAD NEW BUILDINGS

■FERGUSON

BALDWIN

4499 Ruffin Road

www.fpbarch.com

Suite 300

619 231 0751

ARCHITECTS

San Diego CA 92123

© 2020 KIMLEY-HORN AND ASSOCIATES, INC. 401 B STREET, SUITE 600; SAN DIEGO, CA 92101 PHONE: 619-234-9411 WWW.KIMLEY-HORN.COM

PAPE

3020/3030 CALLAN ROA SAN DIEGO, CA 92121

DESCRIPTION NO. DATE

SCHEMATIC DESIGN / DEVELOPMENT
PERMIT DRAFT

DEVELOPMENT
PERMIT SUBMITTAL

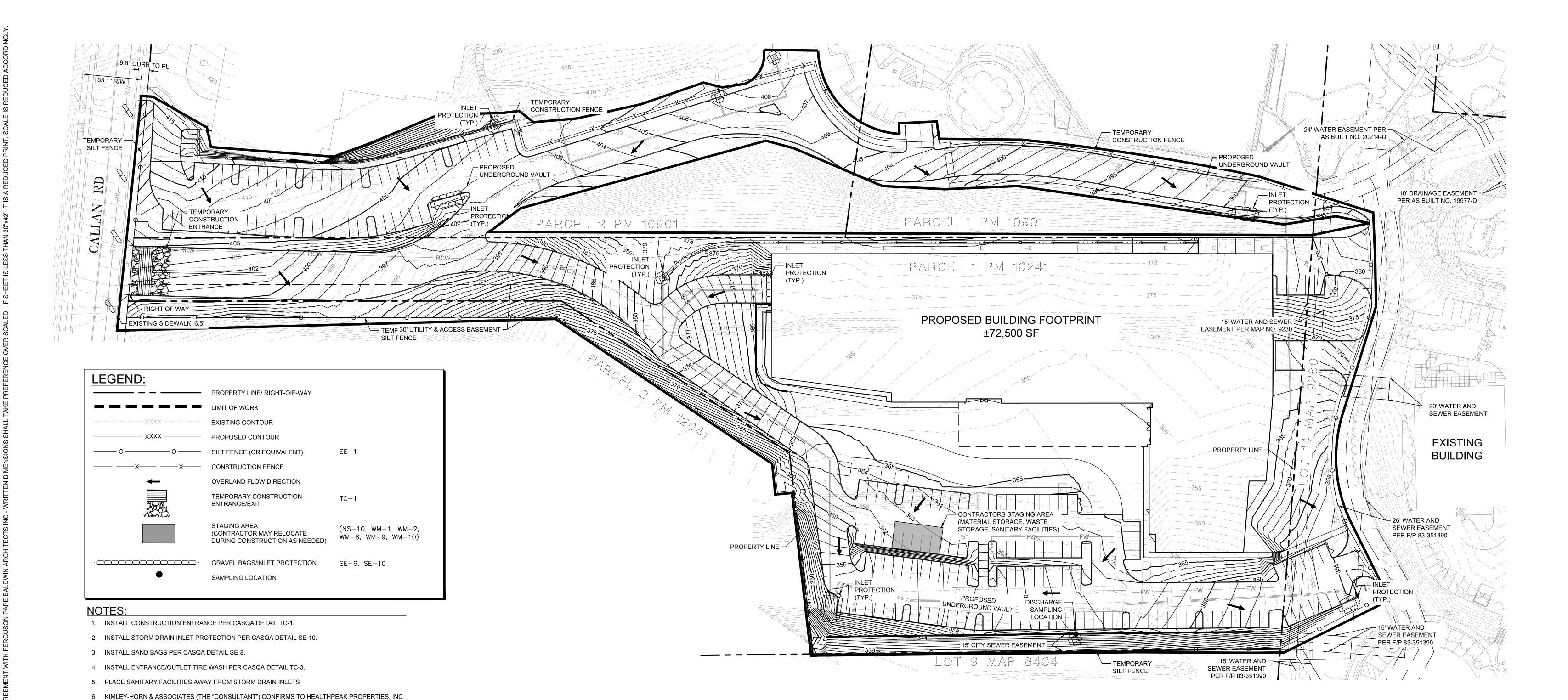
B 2/10/2020

STORMDRAIN AN BMP PLAN

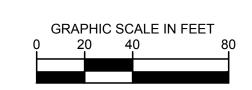
C7.0

EROSION CONTROL PLAN

C8.0







PREPARED BY: FERGUSON PAPE BALDWIN ARCHITECTS ADDRESS: 4499 RUFFIN RD. #300 SAN DIEGO, CA 92123 PHONE NO #: (619) 231-0751 / PHIL PAPE 3020 & 3030 CALLAN RD PROJECT ADDRESS: SAN DIEGO, CA 92121 3020 CALLAN ROAD NEW BUILDINGS PROJECT NAME:

SHEET TITLE:

EROSION CONTROL PLAN

ORIGINAL PREPARATION DATE: FEBRUARY 10, 2020

MUP PROJECT #:

SHEET: **9** OF **54**



THAT CONSULTANT HAS PREPARED THESE PLANS IN ACCORDANCE WITH THE NATIONAL

HYDROSEEDING SHALL BE LOW PROFILE WILDFLOWER MIX PER LANDSCAPE SHEETS

7. GRADED, DISTURBED, OR ERODED AREAS THAT WILL NOT BE PERMANENTLY PAVED, COVERED BY STRUCTURE, OR PLANTED FOR A PERIOD OVER 90 DAYS SHALL BE TEMPORARILY RE-VEGETATED WITH A NON-IRRIGATED HYDROSEED MIX, GROUND COVER, OR EQUIVALENT MATERIAL. SEE SHEET SEED MIX TABLE BELOW FOR MIX AND SPECIFICATIONS. NON-IRRIGATED HYDROSEED MIX SHALL BE INSTALLED BETWEEN NOVEMBER 1ST AND FEBRUARY 15TH. IF THE MIX IS TO BE INSTALLED OUTSIDE OF THISE TIME FRAME, INSTALLATION OF TEMPORARY ABOVE-GROUND IRRIGATION

POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES).

SYSTEM WILL BE REQUIRED FOR ESTABLISHMENT OF HYDROSEED MIX.

Project Name:

Attachment 5 Drainage Report

Attach project's drainage report. Refer to Drainage Design Manual to determine the reporting requirements.



HEALTHPEAK PROPERTIES, INC.

3020 CALLAN ROAD NEW BUILDINGS

Drainage Report

3020/3030 Callan Road SAN DIEGO, CA 92121

D-SHEET NO.: XXXXX-D PROJECT NO.: XXXXX APN: 340-010-44

January 2020

Project Applicant: Healthpeak Properties, Inc. 420 Stevens Avenue, Suite 170 Solana Beach, Ca 92075 858-847-9936

Prepared By:



KIMLEY-HORN AND ASSOCIATES, INC. 401 B STREET, SUITE 600 SAN DIEGO, CA 92101 (619)234-9411

This Drainage Report has been prepared by Kimley-Horn and Associates, Inc. under the direct supervise of the following Registered Civil engineer. The undersigned attests to the technical data contained in study, and to the qualifications of technical specialists providing engineering computations upon which recommendations and conclusions are based.		
Registered Civil Engineer	Date	

THIS PAGE INTENTIONALLY LEFT BLANK

Conten	nts	
1	Projec	t Description1–1
	1.1	Project Description
2	Hydro	logic Analysis2-1
	2.1	Assumptions2-1
	2.2	Methodology2-1
3	Result	rs3–1
	3.1	Drainage Improvements
	3.2	CEQA
	0.2	0197
Figures	S	
Figure	1–1 V	icinity Map1–1
Tables		
		sting Conditions Hydrology2–1
Table	2–1 Ex	sting Conditions Hydrology2–1 oposed Conditions Hydrology2–2
Table :	2–1 Ex 2–2 Pro	pposed Conditions Hydrology2–2
Table :	2–1 Ex 2–2 Pro	
Table Table	2–1 Ex 2–2 Pro 2–3 Pro	pposed Conditions Hydrology2–2
Table :	2–1 Ex 2–2 Pro 2–3 Pro	pposed Conditions Hydrology2–2
Table Table Table Exhibits	2–1 Ex 2–2 Pro 2–3 Pro s	pposed Conditions Hydrology2–2
Table Table Exhibits	2–1 Ex 2–2 Pro 2–3 Pro s s Hydrol	oposed Conditions Hydrology
Table Table Exhibits	2–1 Ex 2–2 Pro 2–3 Pro s s Hydrol	oposed Conditions Hydrology
Table Table Table Exhibit Exhibit	2–1 Ex 2–2 Pro 2–3 Pro s s Hydrol sed Hydr	oposed Conditions Hydrology
Table Table Exhibits	2–1 Ex 2–2 Pro 2–3 Pro s s Hydrol sed Hydr	oposed Conditions Hydrology

Appendix B

Appendix C

Hydromodification Excerpt

Flowmaster Calculations

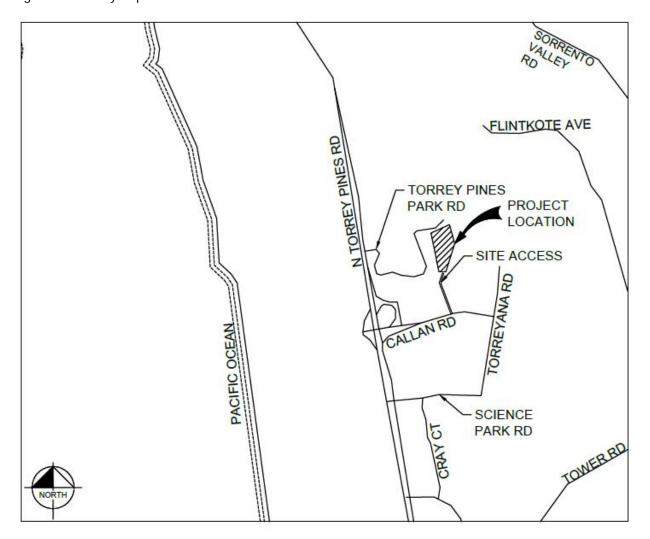
THIS PAGE INTENTIONALLY LEFT BLANK

1 PROJECT DESCRIPTION

1.1 PROJECT DESCRIPTION

The proposed 3020 Callan Road project consists of a redevelopment on a 5.03-acre area located west of Interstate-5 off-ramp on Callan Road in the City of San Diego, CA, see **Figure 1-1** for Vicinity Map. The project proposes demolition of an existing 91,000 square foot building and construction of two new buildings totaling approximately 138,000-148,000 square feet with shared underground parking (2-1/2 levels of buildings over 1-1/2 levels underground parking). The project includes new building, surface parking, driveway improvements, as well as roadway and parking on the adjacent parcels to unite the surrounding properties to a single scientific research park campus. Also included in the project are grading, drainage, sewer and water utility services.

Figure 1–1 Vicinity Map



2 HYDROLOGIC ANALYSIS

2.1 ASSUMPTIONS

Contour information, aerial photographs and site observations were used to delineate the watershed boundary and drainage sub-basins for the project.

2.2 METHODOLOGY

The Rational Method was used to analyze the 100-year storm hydrology for the project and to determine the require proposed pipe and inlet sizes. This methodology is typically used for small basins less than 500 acres in size because a uniform rainfall distribution is assumed for the entire duration. Parameters for precipitation, intensity, runoff coefficients and times of concentration were based on the County of San Diego Hydrology Manual, 2003. Excerpts from the Hydrology Manual are contained in **Appendix B**.

2.2.1 EXISTING SITE HYDROLOGY

The project site is currently fully developed and slopes from south to northeast. Throughout the project area storm runoff is collected in existing curb and grate inlets. Within each of the existing parking lots there are curb inlets at the southeast corners that convey runoff east and outlet onto the surface before sheet flowing north to Penasquitos Creek. The property north of the site consists of a greenhouse that also conveys all storm runoff into the same storm system. All runoff from the property west of the site sheet flows into an existing detention basin adjacent to the private road north of the site and does not impact the project area.

The tributary area for curb inlets 1-9 on the attached **Existing Drainage Exhibit in Appendix A** have been delineated as DMA A, B, C, D, E, F, G, H, I, and J and are shown on the exhibit. Refer to **Table 2-1** for the calculated discharge to associated curb inlets from the existing project site.

Table 2–1 Existing Conditions Hydrology

					Flow Rate
	Runoff	Area	Intensity	T _c	100 Year
DMA	Coefficient	(acres)	(in/hr)	(min)	(cfs)
А	0.85	0.38	6.1	5	1.97
В	0.85	0.94	6.1	5	4.87
С	0.85	0.56	6.1	5	2.90
D	0.85	1.07	6.1	5	5.55
E	0.85	0.45	6.1	5	2.33
F	0.85	0.65	6.1	5	3.37
G	0.85	1.40	6.1	5	7.26
Н	0.85	1.24	6.1	5	6.43
I	0.85	0.86	6.1	5	4.56
J	0.85	1.89	6.1	5	9.80

2.2.2 PROPOSED SITE HYDROLOGY

The area of disturbance for the proposed redevelopment of 3020 Callan Road is approximately 6.97 acers and shown as DMA A, E, and H. DMA D, F and G consist of a 0.78-acres, 0.57-acres, and 1.38-acres respectively are made of up existing landscape, Torrey Pine trees, and an existing greenhouse development that are to be undisturbed and protected in place. As these areas are not a part of the project they are not included in the overall water quality calculations for the site but are included in sizing calculations for the proposed storm drain infrastructure that are affected. The flows from DMA D and G will be directed to a concrete brow ditch and grate inlets which will bypass the runoff that is being routed to the proposed underground water quality systems and will outlet to the existing storm drains at the south east side of the property. Flows from DMA F will also bypass the proposed underground storm system and continue to be routed through existing storm drains that outlet at the east side of the property.

DMA A is made up of sub areas DMA B and DMA C totaling 5.48-acres of the project area. Runoff from DMA B is collected and routed to two modular wetland units at the southeast corner of the site before being stored in an underground vault. Runoff from DMA C is collected and routed to a modular wetland at the northeast corner of the site before being routed to an underground vault. All stormwater from DMA B and C is stored in a single underground vault which has been sized for the total water quality and hydromodification volume as shown on the attached **Proposed Drainage Exhibit in Appendix A.** From there it will slowly discharge to the existing 18" storm drain in the middle of the property where it will flow east before sheet flowing north into Penasquitos Creek.

DMA E and H are west of the immediate project area on the adjacent property and therefore have separate underground systems. Each DMA's respective runoff is collected and routed through a modular wetland, into an underground vault and finally slowly outlet into the existing storm drains where it is conveyed east to the known outflow locations.

Table 2–2 Proposed Conditions Hydrology

					Flow Rate
	Runoff	Area	Intensity	T _c	100 Year
DMA	Coefficient	(acres)	(in/hr)	(min)	(cfs)
А	-	-	-	-	-
В	0.85	3.23	6.1	5	16.75
С	0.85	1.81	6.1	5	9.38
D	0.85	0.78	6.1	5	4.04
E	0.85	1.15	6.1	5	5.96
F	0.85	1.38	6.1	5	7.16
G	0.85	0.21	6.1	5	1.09
Н	0.85	0.34	6.1	5	1.76

Per the City of San Diego BMP Design Manual, January 2018 Edition, Table G.2-2: Unit Runoff Ratios for Sizing Factor Method, a Q_2 ratio of 0.439 cfs/acre is the natural runoff ratio for Lindbergh, soil group D, with a steep slope (see **Appendix B**). For the total project area of disturbance (6.97 acres), the natural runoff is 3.06cfs. To satisfy hydromodification requirements, 10% of the natural runoff for the area of disturbance will be discharged from the underground vault at a rate of 0.306 cfs. The discharge from the underground

vault will be added to the other remaining flows leading to the existing 18" storm drain at the east side of the property. Refer to **Table 2-2** for proposed mitigated flow for the project area.

Table 2–3 Proposed Mitigated Flow

	O ₂ Ratio	Area of Disturbance	Runoff	Mitigated Runoff for Hydromodification
DMA	(cfs/acre)	(acres)	(cfs)	(cfs)
А	0.439	5.48	2.41	0.241
E	0.439	1.15	0.50	0.050
Н	0.439	0.34	0.15	0.015
Total	0.439	6.97	3.06	0.306

3 RESULTS

3.1 DRAINAGE IMPROVEMENTS

The existing flows from DMA G and D will be captured and routed to the existing storm drains that are to remain. The existing flow form DMA F will be captured in existing inlets and routed to the existing storm drains that are to remain. Flows from DMA B, C, E, and H will be captured, stored, and treated before being conveyed at a mitigated flow rate to the existing 18" storm outlet pipes. There will be no negative impacts to the site or surrounding properties due to the proposed development.

3.2 CEQA

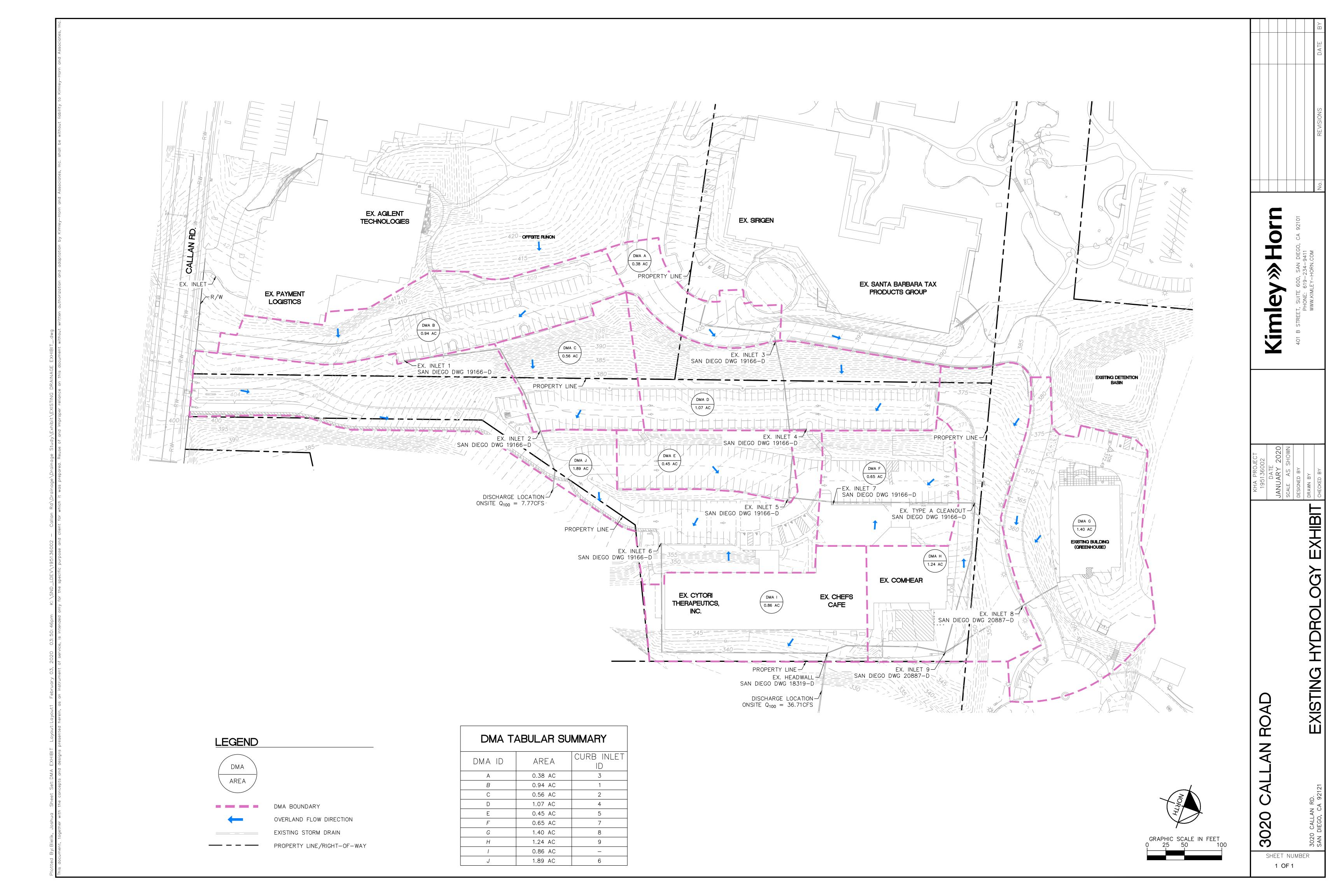
- Due to the mitigated flow of the project to meet hydromodification requirements the proposed improvements will have no negative impacts to any adjacent properties.
- The project is not subject to Regional Water Quality Board approval under Federal Clean Water Act (CWA) section 401 or 404. The proposed project is only subject to the requirements as set forth in the general permit.

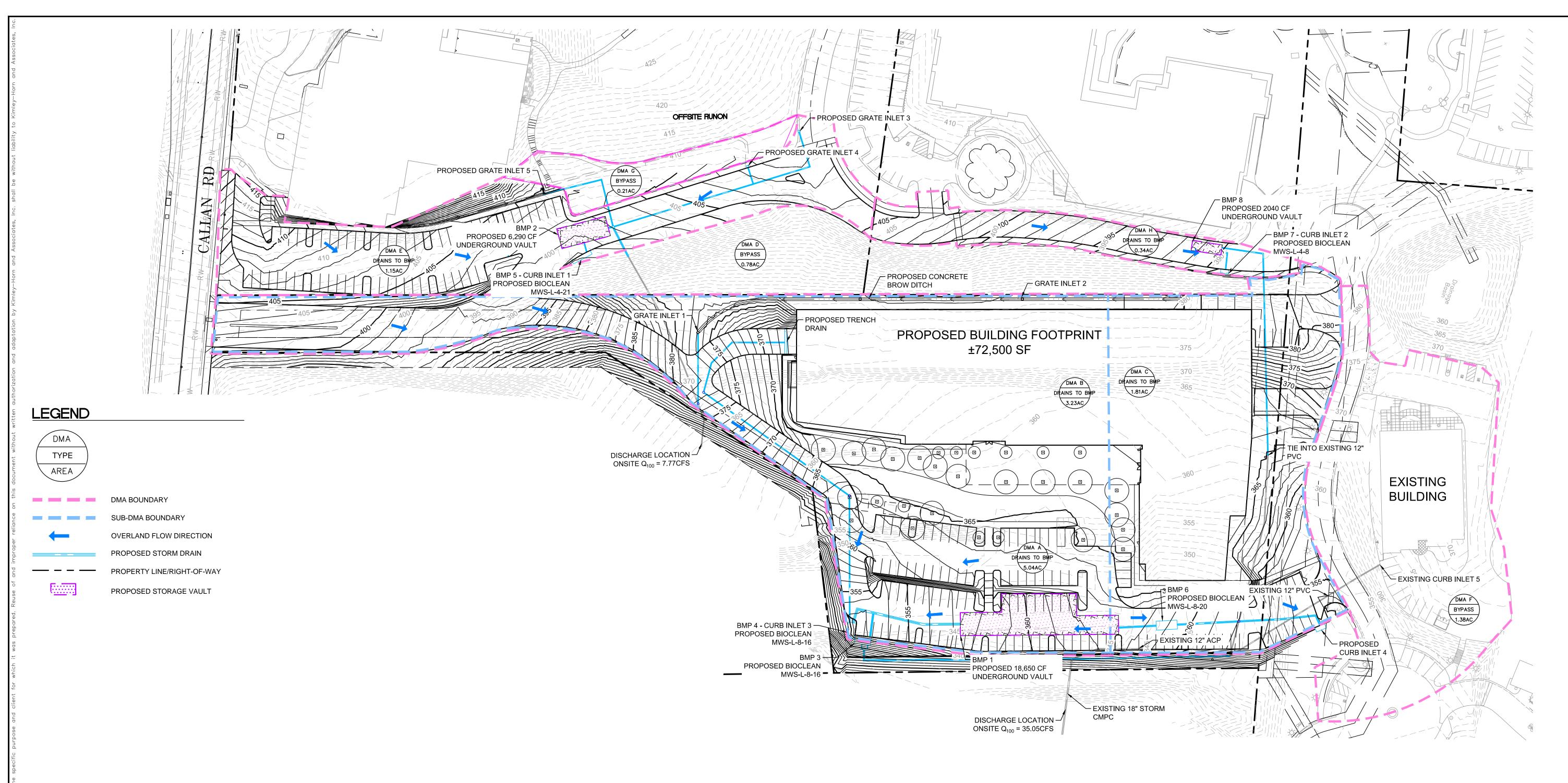
APPENDICES

THIS PAGE INTENTIONALLY LEFT BLANK

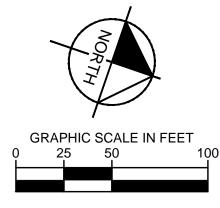
APPENDIX A

HYDROLOGY EXHIBITS





	D	MA TABULA	AR SUMMA	RY	
DMA ID	DMA SUB-ID	TYPE	AREA	CURB INLET ID	GRATE INLET ID
А	В	DRAINS TO BMP	3.23AC	3	
	С	DRAINS TO BMP	1.81 AC	4	
D	-	BYPASS	0.78AC		1, 2
Е	-	DRAINS TO BMP	1.15 AC	1	
F	-	BYPASS	1.38 AC	5	
G	-	BYPASS	0.21 AC		3, 4, 5
Н	-	DRAINS TO BMP	0.34 AC	2	



Kimle PROPOSED AN ROAD

3020

SHEET NUMBER

1 OF 1

THIS PAGE INTENTIONALLY LEFT BLANK

APPENDIX B

HYDROMODIFICATION EXCERPTS

THIS PAGE INTENTIONALLY LEFT BLANK

Appendix G: Guidance for Continuous Simulation and Hydromodification Sizing Factors

biofiltered, project-specific continuous simulation modeling is recommended. Refer to Sections 5.6 and 6.3.6.

Table G.2-6: Sizing Factors for Hydromodification Flow Control Cistern BMPs Designed Using Sizing Factor Method

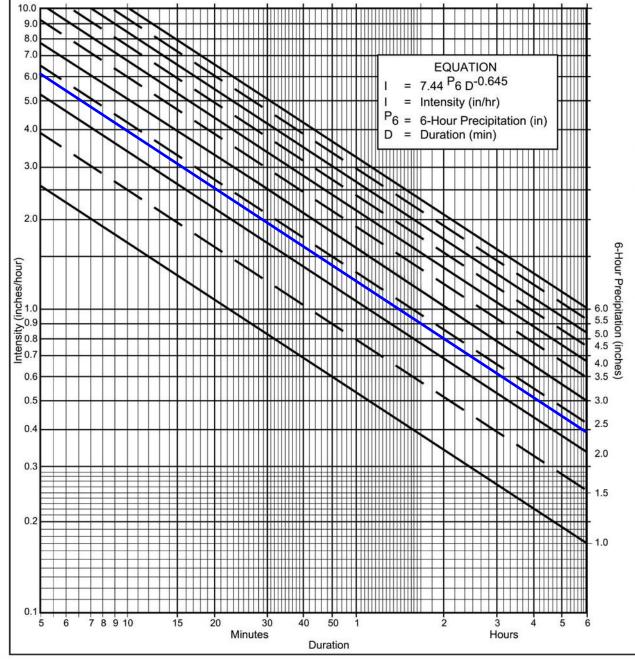
Lower Flow Threshold	Soil Group	Slope	Rain Gauge	V
0.1Q ₂	A	Flat	Lindbergh	0.54
$0.1Q_{2}$	A	Moderate	Lindbergh	0.51
$0.1Q_{2}$	A	Steep	Lindbergh	0.49
$0.1Q_{2}$	В	Flat	Lindbergh	0.19
$0.1Q_{2}$	В	Moderate	Lindbergh	0.18
$0.1Q_2$	В	Steep	Lindbergh	0.18
$0.1Q_2$	С	Flat	Lindbergh	0.11
$0.1Q_2$	С	Moderate	Lindbergh	0.11
$0.1Q_2$	С	Steep	Lindbergh	0.11
$0.1Q_2$	D	Flat	Lindbergh	0.09
$0.1 \mathrm{Q}_2$	D	Moderate	Lindbergh	0.09
0.1Q ₂	D	Steep	Lindbergh	0.09
$0.1Q_{2}$	A	Flat	Oceanside	0.26
$0.1Q_{2}$	A	Moderate	Oceanside	0.25
$0.1Q_{2}$	A	Steep	Oceanside	0.25
$0.1Q_2$	В	Flat	Oceanside	0.16
$0.1Q_2$	В	Moderate	Oceanside	0.16
$0.1Q_2$	В	Steep	Oceanside	0.16
$0.1Q_2$	С	Flat	Oceanside	0.14
$0.1Q_2$	С	Moderate	Oceanside	0.14
$0.1Q_{2}$	С	Steep	Oceanside	0.14
$0.1Q_2$	D	Flat	Oceanside	0.12
$0.1Q_2$	D	Moderate	Oceanside	0.12
$0.1Q_2$	D	Steep	Oceanside	0.12
$0.1Q_2$	A	Flat	L Wohlford	0.53
$0.1Q_2$	A	Moderate	L Wohlford	0.49
$0.1Q_2$	A	Steep	L Wohlford	0.49
$0.1Q_2$	В	Flat	L Wohlford	0.28
$0.1Q_2$	В	Moderate	L Wohlford	0.28
$0.1Q_2$	В	Steep	L Wohlford	0.28



Appendix G: Guidance for Continuous Simulation and Hydromodification Sizing Factors

Rain Gauge	Soil	Slope	Q ₂ (cfs/acre)	Q ₁₀ (cfs/ac)
Oceanside	В	Low	0.377	0.875
Oceanside	В	Moderate	0.391	0.879
Oceanside	В	Steep	0.395	0.881
Oceanside	С	Low	0.488	0.981
Oceanside	С	Moderate	0.497	0.985
Oceanside	С	Steep	0.499	0.986
Oceanside	D	Low	0.571	0.998
Oceanside	D	Moderate	0.575	0.999
Oceanside	D	Steep	0.576	0.999
Lindbergh	Α	Low	0.057	0.384
Lindbergh	A	Moderate	0.073	0.399
Lindbergh	A	Steep	0.082	0.403
Lindbergh	В	Low	0.199	0.496
Lindbergh	В	Moderate	0.220	0.509
Lindbergh	В	Steep	0.230	0.513
Lindbergh	С	Low	0.335	0.601
Lindbergh	С	Moderate	0.349	0.610
Lindbergh	С	Steep	0.354	0.613
Lindbergh	D	Low	0.429	0.751
Lindbergh	D	Moderate	0.437	0.753
Lindbergh	D	Steep	0.439	0.753





Directions for Application:

- (1) From precipitation maps determine 6 hr and 24 hr amounts for the selected frequency. These maps are included in the County Hydrology Manual (10, 50, and 100 yr maps included in the Design and Procedure Manual).
- (2) Adjust 6 hr precipitation (if necessary) so that it is within the range of 45% to 65% of the 24 hr precipitation (not applicable to Desert).
- (3) Plot 6 hr precipitation on the right side of the chart.
- (4) Draw a line through the point parallel to the plotted lines.
- (5) This line is the intensity-duration curve for the location being analyzed.

Application Form:

(a) Selected frequency _____ year

(b)
$$P_6 = 2.3$$
 in., $P_{24} = 3.8$, $P_{6} = 60.5$ %⁽²⁾

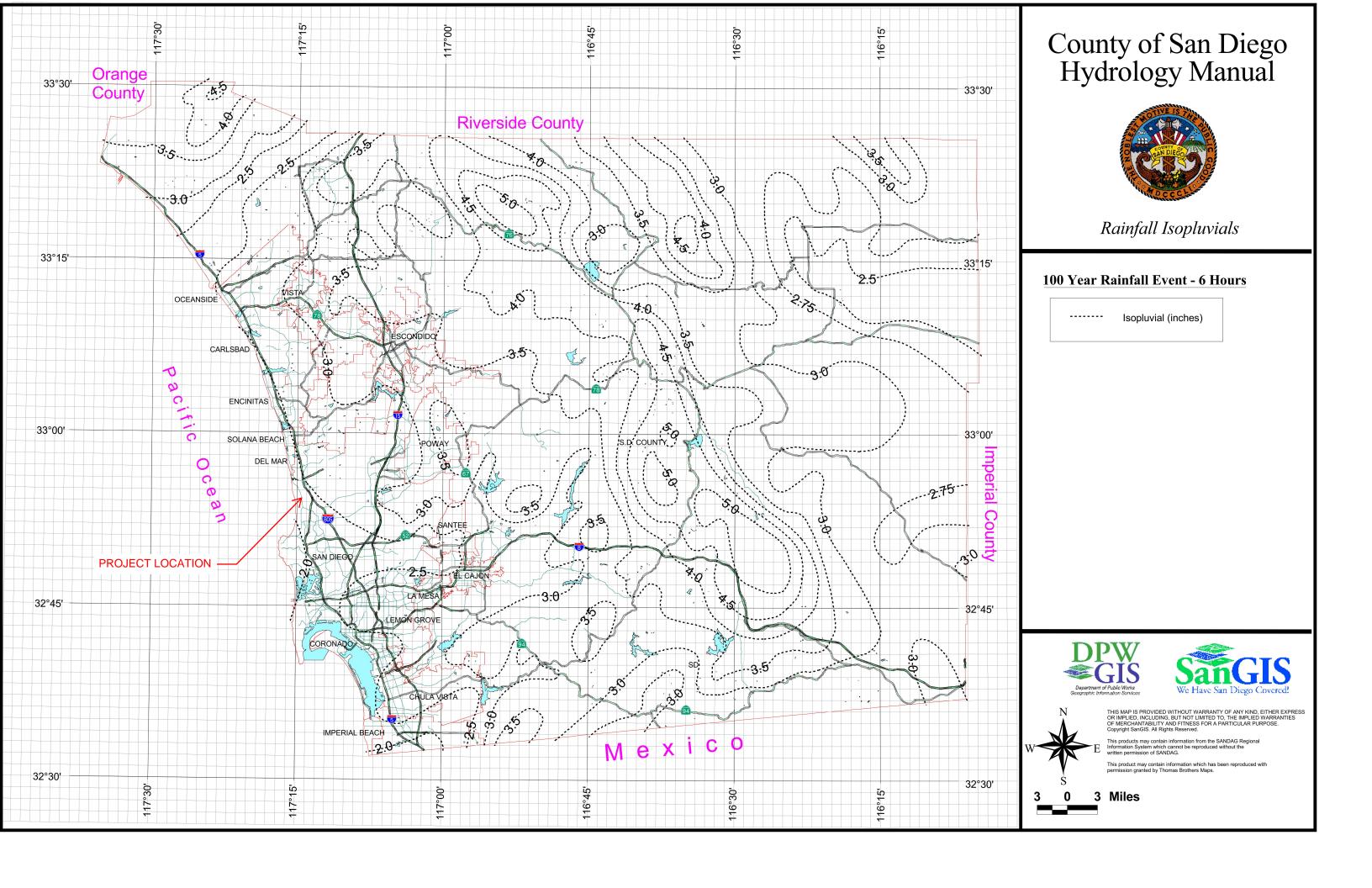
(c) Adjusted $P_6^{(2)} = 2.3$ in.

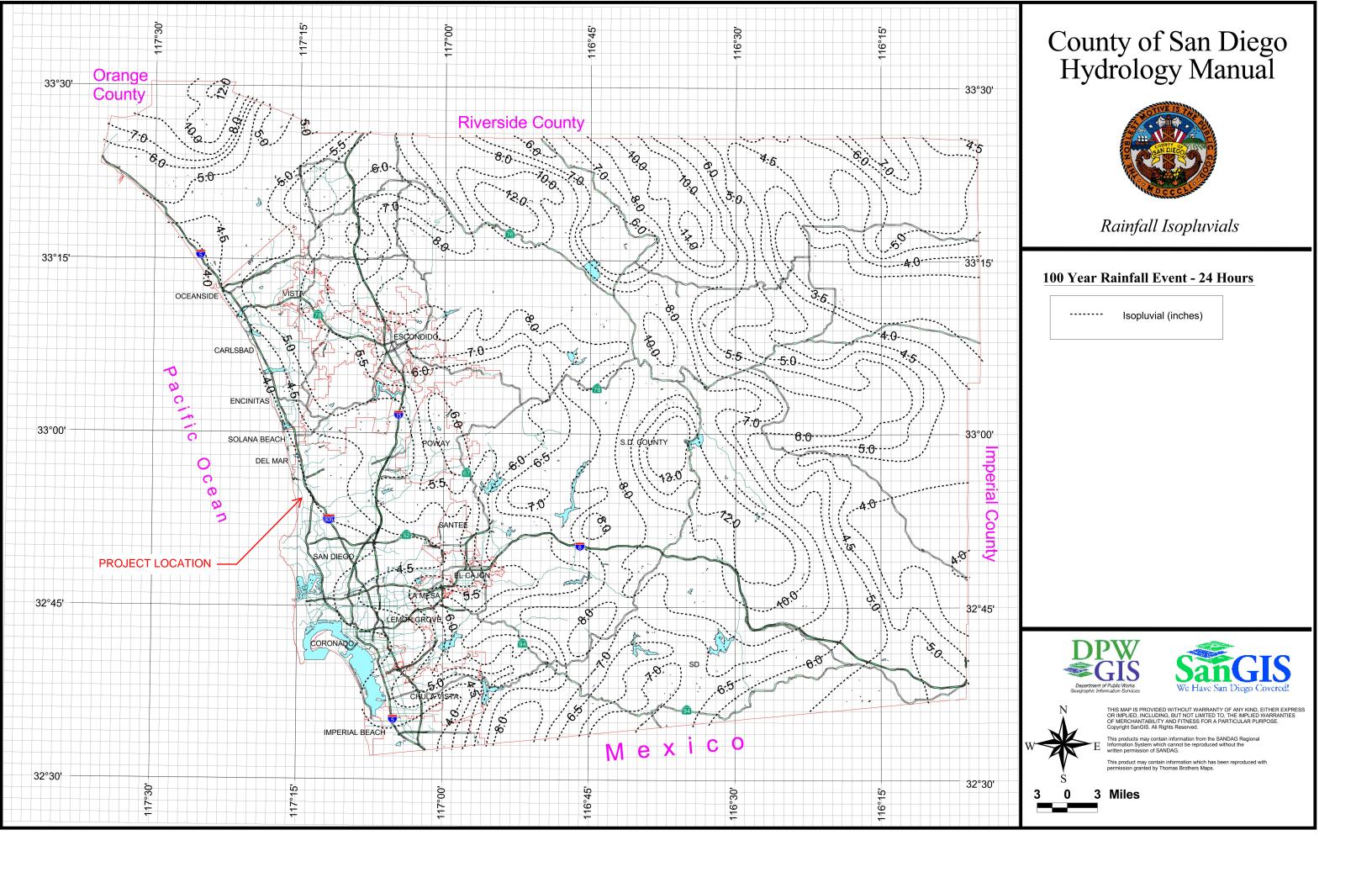
(d)
$$t_x = \frac{5}{m} \min$$

(e)
$$I = ______ 6.1$$
 in./hr.

Note: This chart replaces the Intensity-Duration-Frequency curves used since 1965.

P6	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
Duration	-1	1	- 1	- 1	1	- 1	- 1	- 1	- 1	- 1	- 1
5	2.63	3.95	5.27	6.59	7.90	9.22	10.54	11.86	13.17	14.49	15.81
7	2.12	3.18	4.24	5.30	6.36	7.42	8.48	9.54	10.60	11.66	12.72
10	1.68	2.53	3.37	4.21	5.05	5.90	6.74	7.58	8.42	9.27	10.11
15	1.30	1.95	2.59	3.24	3.89	4.54	5.19	5.84	6.49	7.13	7.78
20	1.08	1.62	2.15	2.69	3.23	3.77	4.31	4.85	5.39	5.93	6.46
25	0.93	1.40	1.87	2.33	2.80	3.27	3.73	4.20	4.67	5.13	5.60
30	0.83	1.24	1.66	2.07	2.49	2.90	3.32	3.73	4.15	4.56	4.98
40	0.69	1.03	1.38	1.72	2.07	2.41	2.76	3.10	3.45	3.79	4.13
50	0.60	0.90	1.19	1.49	1.79	2.09	2.39	2.69	2.98	3.28	3.58
60	0.53	0.80	1.06	1.33	1.59	1.86	2.12	2.39	2.65	2.92	3.18
90	0.41	0.61	0.82	1.02	1.23	1.43	1.63	1.84	2.04	2.25	2.45
120	0.34	0.51	0.68	0.85	1.02	1.19	1.36	1.53	1.70	1.87	2.04
150	0.29	0.44	0.59	0.73	0.88	1.03	1.18	1.32	1.47	1.62	1.76
180	0.26	0.39	0.52	0.65	0.78	0.91	1.04	1.18	1.31	1.44	1.57
240	0.22	0.33	0.43	0.54	0.65	0.76	0.87	0.98	1.08	1.19	1.30
300	0.19	0.28	0.38	0.47	0.56	0.66	0.75	0.85	0.94	1.03	1.13
360	0.17	0.25	0.33	0.42	0.50	0.58	0.67	0.75	0.84	0.92	1.00





APPENDIX C

FLOWMASTER CALCULATIONS

Project Name	e:				
THIS PAGE I	NTENTIONAL	LY LEFT BLAN	K FOR DOUBL	E-SIDED PRINT	ING
THIS PAGE I	NTENTIONAL	LY LEFT BLAN	K FOR DOUBL	E-SIDED PRINT	ING
THIS PAGE I	NTENTIONAL	LY LEFT BLAN	K FOR DOUBL	E-SIDED PRINT	ING
THIS PAGE I	NTENTIONAL	LY LEFT BLAN	K FOR DOUBL	E-SIDED PRINT	ING
THIS PAGE I	NTENTIONAL	LY LEFT BLAN	K FOR DOUBL	E-SIDED PRINT	ING
THIS PAGE I	NTENTIONAL	LY LEFT BLAN	K FOR DOUBL	E-SIDED PRINT	ING
THIS PAGE I	NTENTIONAL	LY LEFT BLAN	K FOR DOUBL	E-SIDED PRINT	ING
THIS PAGE I	NTENTIONAL	LY LEFT BLAN	K FOR DOUBL	E-SIDED PRINT	ING
THIS PAGE I	NTENTIONAL	LY LEFT BLAN	K FOR DOUBL	E-SIDED PRINT	ING
THIS PAGE I	NTENTIONAL	LY LEFT BLAN	K FOR DOUBL	E-SIDED PRINT	ING

Project Name:

Attachment 6 Geotechnical and Groundwater Investigation Report

Attach project's geotechnical and groundwater investigation report. Refer to Appendix C.4 to determine the reporting requirements.



GEOTECHNICAL INVESTIGATION

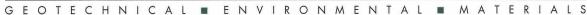
CALLAN ROAD REDEVELOPMENT 3030 CALLAN ROAD SAN DIEGO, CALIFORNIA



GEOTECHNICAL ENVIRONMENTAL MATERIALS PREPARED FOR

PROJECT MANAGEMENT ADVISORS, LLC SOLANA BEACH, CALIFORNIA

JANUARY 30, 2020 PROJECT NO. G2469-11-01





Project No. G2469-11-01 January 30, 2020

Project Management Advisors, Inc. 420 Stevens Avenue, Suite 170 Solana Beach, California 92075

Attention:

Ms. Crista Swan

Subject:

GEOTECHNICAL INVESTIGATION

CALLAN ROAD REDEVELOPMENT

3030 CALLAN ROAD SAN DIEGO, CALIFORNIA

Dear Ms. Swan:

In accordance with your request and authorization of our Proposal No. LG-19437 dated November 6, 2019, we herein submit the results of our geotechnical investigation for the subject project. We performed our investigation to evaluate the underlying soil and geologic conditions and potential geologic hazards, and to assist in the design of the proposed buildings and associated improvements.

The accompanying report presents the results of our study and conclusions and recommendations pertaining to geotechnical aspects of the proposed project. The site is suitable for the proposed buildings and improvements provided the recommendations of this report are incorporated into the design and construction of the planned project.

Should you have questions regarding this report, or if we may be of further service, please contact the undersigned at your convenience.

Very truly yours,

GEOCON INCORPORATED

Lilian E. Rodriguez RCE 83227

GE 2714

No.83227

Shawn Foy Weedon

John Hoobs

CEG 1524

LER:SFW:JH:arm

(email) Addressee

HOOBS CERTIFIED ENGINEERING

GEOLOGIST

TABLE OF CONTENTS

1.	PURI	POSE AND SCOPE	1
2.	SITE AND PROJECT DESCRIPTION		
3.	GEOLOGIC SETTING		
٥.	GLO	LOGIC SETTING	د
4.	SOIL	AND GEOLOGIC CONDITIONS	4
	4.1	Previously Placed Fill (Qpf)	
	4.2	Very Old Paralic Deposits (Qvop)	
	4.3	Scripps Formation (Tsc)	
5.	GRO	UNDWATER	5
6.	GEOLOGIC HAZARDS		
	6.1	Geologic Hazard Category	
	6.2	Faulting and Seismicity	
	6.3	Liquefaction	
	6.4	Storm Surge, Tsunamis, and Seiches	
	6.5	Slope Stability	
	6.6	Landslides	
7.	CON	CLUSIONS AND RECOMMENDATIONS	10
<i>,</i> .	7.1	General	
	7.2	Soil Characteristics	
	7.3	Grading	
	7.4	Excavation Slopes, Shoring and Tiebacks.	
	7.5	Soil Nail Wall	
	7.6	Seismic Design Criteria	
	7.7	Building Foundations.	
	7.8	Concrete Slabs-On-Grade	26
	7.9	Exterior Concrete Flatwork	28
	7.10	Retaining Walls	29
	7.11	Lateral Loading	33
	7.12	Preliminary Pavement Recommendations	
	7.13	Interlocking Pervious Concrete Paver Recommendations	
	7.14	Site Drainage and Moisture Protection	
	7.15	Grading and Foundation Plan Review	39

LIMITATIONS AND UNIFORMITY OF CONDITIONS

MAPS AND ILLUSTRATIONS

APPENDIX A FIELD INVESTIGATION

APPENDIX B LABORATORY TESTING

TABLE OF CONTENTS (Concluded)

APPENDIX C RECOMMENDED GRADING SPECIFICATIONS

LIST OF REFERENCES

GEOTECHNICAL INVESTIGATION

1. PURPOSE AND SCOPE

This report presents the results of our geotechnical investigation for the construction of two new office buildings and associated improvements located within the Torrey Pines area in the City of San Diego, California (see Vicinity Map, Figure 1). The purpose of the geotechnical investigation is to evaluate the surface and subsurface soil conditions and general site geology, and to identify geotechnical constraints that may affect development of the property including faulting, liquefaction and seismic shaking based on the 2019 CBC seismic design criteria. In addition, we provided recommendations for remedial grading, shallow foundations, concrete slab-on-grade, concrete flatwork, pavement, and retaining walls.

We reviewed the following plans and report in preparation of this report:

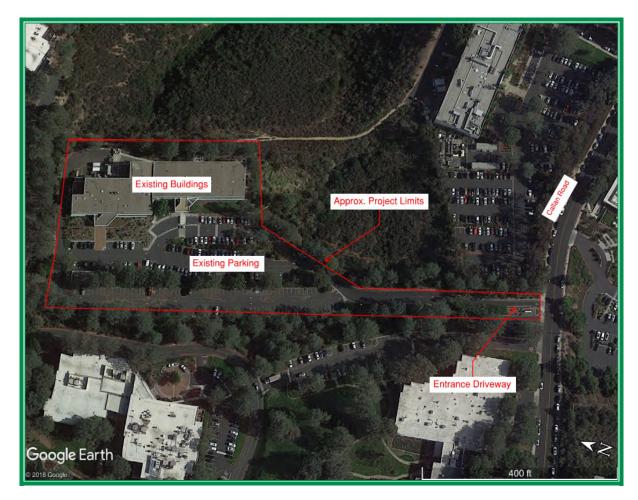
- 1. *Site Plan Exhibit, Callan Redevelopment, San Diego, California*, prepared by Kimley-Horn, dated January 16, 2020.
- 2. Overall Site Plan, 3030 Callan Road, San Diego, California, prepared by FPB Architects, dated September 13, 2019.
- 3. Geotechnical Investigation for Synthetic Genomics, 11099 North Torrey Pines Road, San Diego, California, prepared by Geocon Incorporated, dated October 23, 2008 (Project No. 1008-52-01).
- 4. Geotechnical Investigation for IRT Site, Torrey Pines Science Park, Unit No. 2, Lot 10, San Diego, California, prepared by Geocon Incorporated, dated July 9, 1979 (Project No. D-1851-T02).

The scope of this investigation included reviewing readily available published and unpublished geologic literature (see List of References); performing engineering analyses; and preparing this report. We also advanced 5 exploratory borings to a maximum depth of about 30½ feet, performed percolation/infiltration testing, sampled soil and performed laboratory testing. Appendix A presents the exploratory boring logs and details of the field investigation. The details of the laboratory tests and a summary of the test results are shown in Appendix B and on the boring logs in Appendix A. the results of our percolation/infiltration testing are summarized in our storm water management investigation that is presented in separate report.

2. SITE AND PROJECT DESCRIPTION

The irregularly-shaped, approximately 2.65-acre property currently consists of two occupied office buildings, asphalt parking and driveways, concrete flatwork, landscaping and associated improvements. The site is located on the north side of Callan Road within the Torrey Pines Business

Park and is bordered by office buildings to north, west and south, and undeveloped descending hillside to the east and south. Access to the property extends from Callan Road along an approximately 400-foot driveway to the parking lot. Ascending landscaped slopes extending to neighboring properties exist along the north and west perimeters of the site, and slopes exist between three tiers of on-grade asphalt parking levels. The existing elevations range from approximately 350 to 400 feet Mean Sea Level (MSL) at the northeast corner of the site and the entrance at Callan Road, respectively. The Existing Site Map shows the current site conditions.



Existing Site Map

Based on review of the referenced site plans, construction will consist of two, four-level office buildings (Buildings A and B) that will include one subterranean level (Level P1) with a finish floor elevation of 352 feet above MSL. Building A will be located on the southern portion of the site and Building B on the northern portion. The proposed buildings are shown on Geologic Map, Figure 2. Each building will have one level of subterranean for parking and a portion of the second level (Level L1) also designated for parking. Driveway entrances for the buildings will be located at the south end of Building A and the north end of Building B at Level L1 at an elevation of 364 feet MSL.

Surface parking will be located to the west of the Building A and adjacent to the entrance of the property from Callan Road. We expect each building will have a mechanical equipment yard along with surrounding landscaping, and storm-water management devices will be constructed on the lower elevations of the site.

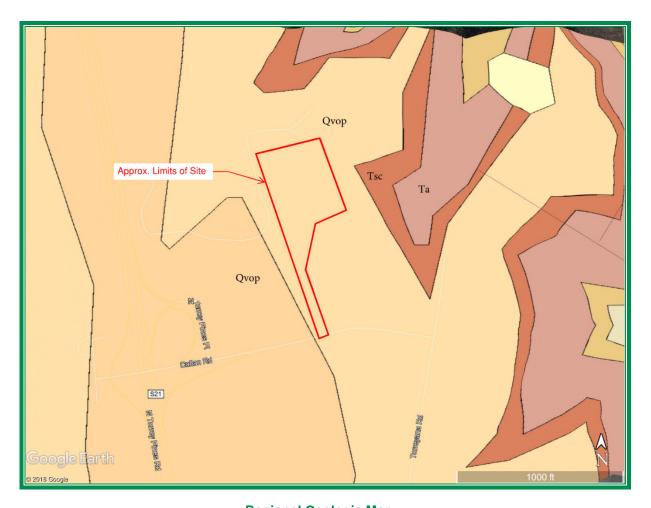
The locations, site descriptions, and proposed development are based on our site reconnaissance, review of published geologic literature, field investigations, and discussions with project personnel. If development plans differ from those described herein, Geocon Incorporated should be contacted for review of the plans and possible revisions to this report.

3. GEOLOGIC SETTING

Regionally, the site is located in the Peninsular Ranges geomorphic province. The province is bounded by the Transverse Ranges to the north, the San Jacinto Fault Zone on the east, the Pacific Ocean coastline on the west, and the Baja California on the south. The province is characterized by elongated northwest-trending mountain ridges separated by straight-sided sediment-filled valleys. The northwest trend is further reflected in the direction of the dominant geologic structural features of the province that are northwest to west-northwest trending folds and faults, such as the nearby Rose Canyon fault zone.

Locally, the site is within the coastal plain of San Diego County. The coastal plain is underlain by a thick sequence of relatively undisturbed and non-conformable sedimentary bedrock units that thicken to the west and range in age from Upper Cretaceous age through the Pleistocene age which have been deposited on Cretaceous to Jurassic age igneous and volcanic bedrock. Geomorphically, the coastal plain is characterized by a series of twenty-one, stair-stepped marine terraces (younger to the west) that have been dissected by west flowing rivers. The coastal plain is a relatively stable block that is dissected by relatively few faults consisting of the potentially active La Nacion Fault Zone and the active Rose Canyon Fault Zone. The Regional Geologic Map shows the geologic conditions in the vicinity of the subject project (Kennedy & Tan, 2008).

The site is located on the western portion of the coastal plain. Marine sedimentary units make up the geologic sequence encountered on the site and consist of Quaternary-age Very Old Paralic Deposits and the Eocene-age Scripps Formation. The Regional Geologic Map shows the geologic conditions in the vicinity of the subject project (Kennedy & Tan, 2008).



Regional Geologic Map

4. SOIL AND GEOLOGIC CONDITIONS

We encountered one surficial soil unit (consisting of undocumented fill) and two formational units (consisting of Very Old Paralic Deposits and Scripps Formation). The occurrence, distribution, and description of each unit encountered is shown on the Geologic Map, Figure 2 and on the boring logs in Appendix A. The Geologic Cross-Sections, Figure 3, show the approximate subsurface relationship between the geologic units. The surficial soil and geologic units are described herein in order of increasing age.

4.1 Previously Placed Fill (Qpf)

We encountered previously placed fill in Borings B-1, B-3 and B-4 to depths ranging from about 3 to 7 feet. In general, the fill consists of medium dense, moist, clayey sand to sandy clay and likely possesses a "very low" to "low" expansion index (expansion index of 50 or less). The upper portions of the previously placed fill is not considered suitable in its current condition for the support of

foundations or structural fill and remedial grading will required. The previously placed fill can be reused for new compacted fill during grading operations provided it is free of roots and debris.

4.2 Very Old Paralic Deposits (Qvop)

Quaternary-age Very Old Paralic Deposits, Unit 10 (formerly called the Lindavista Formation) exists at grade in Borings B-2 and B-5 and underlies the existing fill soil in Boring B-3. The Very Old Paralic Deposits consists of dense to very dense sandstone and cobble conglomerate. We expect these materials possess a "very low" to "low" expansive potential (expansion index of 50 or less). Excavations within this unit will likely be difficult in the cemented zones and oversize material with abundant cobbles may be generated. In addition, coring and rock breaking equipment may be required to excavate the very dense and cemented sandstone and cobble layers. The Very Old Paralic Deposits are considered suitable to support additional fill and/or structural loads.

4.3 Scripps Formation (Tsc)

We encountered Eocene-age Scripps Formation underlying fill within Boring B-1 and below the Very Old Paralic Deposits in Borings B-3 and B-4. The Scripps Formation is generally brown, yellowish brown to light gray, silty to clayey sandstone and sandy siltstone/claystone with layers of strongly-cemented material. Our laboratory tests and experience indicate the Scripps Formation possesses a "very low" to "medium" expansion potential (expansion index of 90 or less). The Scripps Formation may possess a "S0" to "S2" water-soluble sulfate content that could require specialized concrete. The Scripps Formation is generally considered suitable for support of properly compacted structural fill and improvements.

5. GROUNDWATER

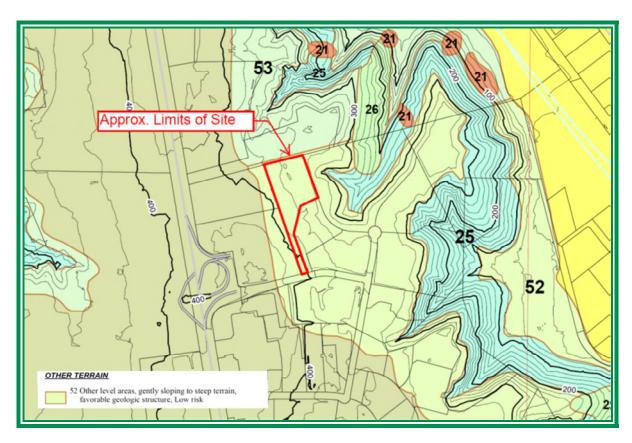
We did not encounter groundwater or seepage during our site investigation. However, it is not uncommon for shallow seepage conditions to develop where none previously existed when sites are irrigated or infiltration is implemented. Seepage is dependent on seasonal precipitation, irrigation, land use, among other factors, and varies as a result. Proper surface drainage will be important to future performance of the project. We expect groundwater is deeper than about 50 feet below existing grade. We do not expect groundwater to be encountered during construction of the proposed development.

6. GEOLOGIC HAZARDS

6.1 Geologic Hazard Category

The City of San Diego Seismic Safety Study, Geologic Hazards and Faults, Map Sheet 34 defines the site with *Hazard Category 52: Other Terrain – Other level areas, gently sloping to steep terrain, favorable geologic structure; Low Risk.* Based on a review of the map, a fault does not traverse the

planned development area. However, an unnamed fault is mapped approximately ¾ mile to southeast and the Carmel Valley Fault is mapped approximately 1 mile to the northwest of the site. The City of San Diego Seismic Safety Map shows the proposed property and hazard category.



City of San Diego Seismic Safety Map

6.2 Faulting and Seismicity

A review of the referenced geologic materials and our knowledge of the general area indicate that the site is not underlain by active, potentially active, or inactive faults. An active fault is defined by the California Geological Survey (CGS) as a fault showing evidence for activity within the last 11,000 years. The site is not located within a State of California Earthquake Fault Zone.

According to the computer program *EZ-FRISK* (Version 7.65), 7 known active faults are located within a search radius of 50 miles from the property. We used the 2008 USGS fault database that provides several models and combinations of fault data to evaluate the fault information. Based on this database, the nearest known active fault is the Newport-Inglewood Fault system, located approximately 2 miles west of the site, and is the dominant source of potential ground motion. Earthquakes that might occur on the Newport-Inglewood Fault or other faults within the southern California and northern Baja California area are potential generators of significant ground motion at

the site. The estimated deterministic maximum earthquake magnitude and peak ground acceleration for the Newport-Inglewood Fault are 7.5 and 0.51g, respectively. Table 6.2.1 lists the estimated maximum earthquake magnitude and peak ground acceleration for the most dominant faults in relationship to the site location. We calculated peak ground acceleration (PGA) using Boore-Atkinson (2008) NGA USGS2008, Campbell-Bozorgnia (2008) NGA USGS 2008 and Chiou-Youngs (2007) NGA USGS2008 acceleration-attenuation relationships.

TABLE 6.2.1
DETERMINISTIC SPECTRA SITE PARAMETERS

		Maximum	Peak G	Fround Acceler	ation
Fault Name	Distance from Site (miles)	Earthquake Magnitude (Mw)	Boore- Atkinson 2008 (g)	Campbell- Bozorgnia 2008 (g)	Chiou- Youngs 2007 (g)
Newport - Inglewood	2	7.5	0.41	0.42	0.51
Rose Canyon	2	6.9	0.37	0.41	0.45
Coronado Bank	17	7.4	0.18	0.14	0.16
Palos Verdes Connected	17	7.7	0.20	0.15	0.19
Elsinore	33	7.9	0.13	0.09	0.11
Earthquake Valley	42	6.8	0.06	0.05	0.04
Palos Verdes	47	7.3	0.07	0.06	0.05

We used the computer program *EZ-FRISK* to perform a probabilistic seismic hazard analysis. The computer program *EZ-FRISK* operates under the assumption that the occurrence rate of earthquakes on each mappable Quaternary fault is proportional to the faults slip rate. The program accounts for fault rupture length as a function of earthquake magnitude, and site acceleration estimates are made using the earthquake magnitude and distance from the site to the rupture zone. The program also accounts for uncertainty in each of following: (1) earthquake magnitude, (2) rupture length for a given magnitude, (3) location of the rupture zone, (4) maximum possible magnitude of a given earthquake, and (5) acceleration at the site from a given earthquake along each fault. By calculating the expected accelerations from considered earthquake sources, the program calculates the total average annual expected number of occurrences of site acceleration greater than a specified value. We utilized acceleration-attenuation relationships suggested by Boore-Atkinson (2008) NGA USGS 2008, Campbell-Bozorgnia (2008) NGA USGS 2008 and Chiou-Youngs (2007) NGA USGS2008 in the analysis. Table 6.2.2 presents the site-specific probabilistic seismic hazard parameters including acceleration-attenuation relationships and the probability of exceedence.

TABLE 6.2.2
PROBABILISTIC SEISMIC HAZARD PARAMETERS

	Peak Ground Acceleration			
Probability of Exceedence	Boore-Atkinson, 2008 (g)	Campbell-Bozorgnia, 2008 (g)	Chiou-Youngs, 2007 (g)	
2% in a 50 Year Period	0.49	0.52	0.59	
5% in a 50 Year Period	0.32	0.33	0.37	
10% in a 50 Year Period	0.22	0.22	0.23	

While listing peak accelerations is useful for comparison of potential effects of fault activity in a region, other considerations are important in seismic design, including the frequency and duration of motion and the soil conditions underlying the site. Seismic design of the structure should be evaluated in accordance with the California Building Code (CBC) guidelines currently adopted by the City of San Diego.

6.3 Liquefaction

Liquefaction typically occurs when a site is located in a zone with seismic activity, onsite soils are cohesionless or silt/clay with low plasticity, groundwater is encountered within 50 feet of the surface and soil densities are less than about 70 percent of the maximum dry densities. If the four previous criteria are met, a seismic event could result in a rapid pore water pressure increase from the earthquake-generated ground accelerations. Due to the lack of a permanent, near-surface groundwater table and the very dense nature of the underlying fill, Very Old Paralic Deposits and Scripps Formation, liquefaction potential for the site is considered very low.

6.4 Storm Surge, Tsunamis, and Seiches

Storm surges are large ocean waves that sweep across coastal areas when storms make landfall. Storm surges can cause inundation, severe erosion and backwater flooding along the water front. The site is located approximately 1 mile from the Pacific Ocean at an elevation of approximately 350 feet or greater above Mean Sea Level (MSL). Therefore, the potential of storm surges affecting the site is considered low.

A tsunami is a series of long period waves generated in the ocean by a sudden displacement of large volumes of water. Causes of tsunamis include underwater earthquakes, volcanic eruptions, or offshore slope failures. The site is not included within one of these high-risk hazard areas. The site is located approximately 1 mile from the Pacific Ocean at an elevation of approximately 350 feet or greater above Mean Sea Level (MSL). Therefore, we consider the risk of a tsunami hazard at the site to be low.

A seiche is a run-up of water within a lake or embayment triggered by fault- or landslide-induced ground displacement. The site is not located near an inland body of water; therefore, we consider the potential for seiches to impact the site low.

6.5 Slope Stability

Planned fill slopes exist along the east perimeter of the site with heights up to approximately 20 feet. In addition, a cut slope into formational Very Old Paralic Deposits is proposed along the west side of the property with a height of up to approximately 25 feet. Slope stability analyses for the proposed fill and cut slopes with inclinations as steep as 2:1 (horizontal to vertical) indicate a calculated factor of safety of at least 1.5 under static conditions for both deep-seated and surficial failure. Figures 4 and 5 presents the slope stability calculations for deep-seated and surficial failures for the proposed fill and cut slopes, respectively.

Slopes should be landscaped with drought-tolerant vegetation having variable root depths and requiring minimal landscape irrigation. In addition, slopes should be drained and properly maintained to reduce erosion.

6.6 Landslides

We did not observe evidence of previous or incipient slope instability at the site during our study and the property is relatively flat. Published geologic mapping indicates landslides are not present on or adjacent to the site. Therefore, in our professional opinion, the potential for a landslide is not a significant concern for this project.

7. CONCLUSIONS AND RECOMMENDATIONS

7.1 General

- 7.1.1 We did not encounter soil or geologic conditions during our exploration that would preclude the proposed development, provided the preliminary recommendations presented herein are followed and implemented during design and construction. We will provide supplemental recommendations if we observe variable or undesirable conditions during construction, or if the proposed construction will differ from that anticipated herein.
- 7.1.2 With the exception of possible moderate to strong seismic shaking, we did not observe or know of significant geologic hazards to exist on the site that would adversely affect the proposed project.
- 7.1.3 The upper portion of the previously placed fill are unsuitable in their present condition for the support of compacted fill or settlement-sensitive improvements. Remedial grading of these materials should be performed as discussed herein. The underlying Very Old Paralic Deposits and Scripps Formation are considered suitable for the support of proposed fill and structural loads.
- 7.1.4 We did not encounter groundwater during our subsurface exploration and we do not expect it to be a constraint to project development. However, seepage within surficial and formational materials may be encountered during the grading operations, especially during the rainy seasons.
- 7.1.5 Excavation of the fill, Very Old Paralic Deposits and Scripps Formation should generally be possible with moderate to heavy effort using conventional, heavy-duty equipment during grading and trenching operations. We expect very heavy effort with possible refusal in localized areas for excavations into strongly cemented portions of the Very Old Paralic Deposits and Scripps Formation. Oversized rock (rocks greater than 12-inches in dimension) may be generated with the granitic rock materials that can be incorporated into landscape use or deep compacted fill areas, if available.
- 7.1.6 We expect the planned structure will be supported on conventional shallow foundations and a concrete slab-on-grade. The foundations will be embedded in either properly compacted fill or formational materials.
- 7.1.7 Proper drainage should be maintained in order to preserve the engineering properties of the fill in both the building pads and slope areas. Recommendations for site drainage are provided herein.

- 7.1.8 Based on our review of the project plans, we opine the planned development can be constructed in accordance with our recommendations provided herein. We do not expect the planned development will destabilize or result in settlement of adjacent properties.
- 7.1.9 Surface settlement monuments and canyon subdrains will not be required on this project.

7.2 Soil Characteristics

7.2.1 The soil encountered in the field investigation is considered to be "non-expansive" (expansion index [EI] of 20 or less) as defined by 2019 California Building Code (CBC) Section 1803.5.3. Table 7.2.1 presents soil classifications based on the expansion index. We expect a majority of the soil encountered possess a "very low" to "low" expansion potential (EI of 50 or less).

TABLE 7.2.1
EXPANSION CLASSIFICATION BASED ON EXPANSION INDEX

Expansion Index (EI)	ASTM D 4829 Expansion Classification	2019 CBC Expansion Classification
0 – 20	Very Low	Non-Expansive
21 – 50	Low	
51 – 90	Medium	Ei
91 – 130	High	Expansive
Greater Than 130	Very High	

7.2.2 We performed laboratory tests on samples of the site materials to evaluate the percentage of water-soluble sulfate content. Appendix B presents results of the laboratory water-soluble sulfate content tests. The test results indicate the on-site materials at the locations tested possess "S0" sulfate exposure to concrete structures as defined by 2019 CBC Section 1904 and ACI 318-14 Chapter 19. However, some areas of the Scripps Formation possess "S1" to "S2" water-soluble sulfate contents and additional concrete design recommendations may be encountered during construction. Table 7.2.2 presents a summary of concrete requirements set forth by 2019 CBC Section 1904 and ACI 318. The presence of water-soluble sulfates is not a visually discernible characteristic; therefore, other soil samples from the site could yield different concentrations. Additionally, over time landscaping activities (i.e., addition of fertilizers and other soil nutrients) may affect the concentration.

TABLE 7.2.2 REQUIREMENTS FOR CONCRETE EXPOSED TO SULFATE-CONTAINING SOLUTIONS

Exposure Class	Water-Soluble Sulfate (SO ₄) Percent by Weight	Cement Type (ASTM C 150)	Maximum Water to Cement Ratio by Weight ¹	Minimum Compressive Strength (psi)
S0	SO ₄ <0.10	No Type Restriction	n/a	2,500
S1	0.10 <u><</u> SO ₄ <0.20	II	0.50	4,000
S2	0.20 <u><</u> SO ₄ <u><</u> 2.00	V	0.45	4,500
S 3	SO ₄ >2.00	V+Pozzolan or Slag	0.45	4,500

¹Maximum water to cement ratio limits do not apply to lightweight concrete.

7.2.3 Geocon Incorporated does not practice in the field of corrosion engineering. Therefore, further evaluation by a corrosion engineer may be performed if improvements susceptible to corrosion are planned.

7.3 Grading

- 7.3.1 Grading should be performed in accordance with the recommendations provided in this report, the Recommended Grading Specifications contained in Appendix C and the City of San Diego's Grading Ordinance. Geocon Incorporated should observe the grading operations on a full-time basis and provide testing during the fill placement.
- 7.3.2 Prior to commencing grading, a preconstruction conference should be held at the site with the county inspector, developer, grading and underground contractors, civil engineer, and geotechnical engineer in attendance. Special soil handling and/or the grading plans can be discussed at that time.
- 7.3.3 Site preparation should begin with the removal of deleterious material, paving and hardscape materials, debris, and vegetation. The depth of vegetation removal should be such that material exposed in cut areas or soil to be used as fill is relatively free of organic matter. Material generated during stripping and/or site demolition should be exported from the site. Asphalt and concrete should not be mixed with the fill soil unless approved by the Geotechnical Engineer. Crushed asphalt grindings and concrete crushed to base size materials can be reused as new fill soils or mixed with fill materials placed outside building pad areas.
- 7.3.4 Abandoned foundations and buried utilities (if encountered) should be removed and the resultant depressions and/or trenches should be backfilled with properly compacted material as part of the remedial grading.

- 7.3.5 Based on the current site plans, we expect the planned buildings will be supported on a shallow foundation system embedded into formational materials (Very Old Paralic Deposits or Scripps Formation). However, we expect that the eastern portion of Building B will expose previously placed fill at finish grade for parking level P1. Where previously placed fill is exposed at finish grade within the building pads, the upper 3 feet should be removed and replaced with new compacted fill. The removals should extend at least 5 feet outside the building pads. The removals should be limited to expose formational materials (e.g. if formation is 1 foot down, the 3-foot removal should be limited to 1 foot). No undercutting of formational materials below finish grade within the building pads should occur.
- 7.3.6 In areas of proposed improvements outside of the building areas, the upper 2 feet of existing soil should be processed, moisture conditioned as necessary and recompacted. Deeper removals may be required in areas where loose or saturated materials are encountered. The removals should extend at least 2 feet outside of the improvement area, where possible. Table 7.3.1 provides a summary of the grading recommendations.

TABLE 7.3.1
SUMMARY OF GRADING RECOMMENDATIONS

Area	Removal Requirements	
Duilding Dada	Removal of Previously Placed Fill to expose Formational Materials	
Building Pads	Maximum Removal of 3 Feet of Existing Fill Materials	
Improvement Areas Outside Building Pads	Process Upper 2 Feet of Existing Materials	
Lateral Continue Line's	5 Feet Outside of Buildings	
Lateral Grading Limits	2 Feet Outside of Improvement Areas,	
E and I Barrana C Barra I'd C a I'd	No Processing – Building Pads	
Exposed Bottoms of Remedial Grading	Scarify Upper 12 Inches – Improvements Areas	

- 7.3.7 The bottom of the excavations should be sloped 1 percent to the adjacent street or deepest fill. Prior to fill soil being placed, the existing ground surface should be scarified, moisture conditioned as necessary, and compacted to a depth of at least 12 inches. However, the upper 12 inches of formational materials exposed in building pad areas during grading should not be scarified. Deeper removals may be required if saturated or loose fill soil is encountered. A representative of Geocon should be on-site during removals to evaluate the limits of the remedial grading.
- 7.3.8 Some areas of overly wet and saturated soil could be encountered due to the existing landscape and pavement areas that will require deeper removals during remedial grading.

The saturated soil would require additional effort prior to placement of compacted fill or additional improvements. Stabilization of the soil would include scarifying and air-drying, removing and replacement with drier soil, undercutting at least 2 feet with the use of stabilization fabric (e.g. Tensar TX7, Mirafi 370HP, or other approved structural grid) and replacement with properly compacted base materials, or dry cement mixing with wet soils.

- 7.3.9 The site should then be brought to final subgrade elevations with fill compacted in layers. In general, soil native to the site is suitable for use from a geotechnical engineering standpoint as fill if relatively free from vegetation, debris and other deleterious material. Layers of fill should be about 6 to 8 inches in loose thickness and no thicker than will allow for adequate bonding and compaction. Fill, including backfill and scarified ground surfaces, should be compacted to a dry density of at least 90 percent of the laboratory maximum dry density near to slightly above optimum moisture content in accordance with ASTM Test Procedure D 1557. Fill materials placed below optimum moisture content may require additional moisture conditioning prior to placing additional fill. The upper 12 inches of subgrade soil underlying pavement should be compacted to a dry density of at least 95 percent of the laboratory maximum dry density near to slightly above optimum moisture content shortly before paving operations.
- 7.3.10 Import fill (if necessary) should consist of the characteristics presented in Table 7.3.2. Geocon Incorporated should be notified of the import soil source and should perform laboratory testing of import soil prior to its arrival at the site to determine its suitability as fill material.

TABLE 7.3.2
SUMMARY OF IMPORT FILL RECOMMENDATIONS

Soil Characteristic	Values	
Expansion Potential	"Very Low" to "Low" (Expansion Index of 50 or less)	
D .: 1 . C:	Maximum Dimension Less Than 3 Inches	
Particle Size	Generally Free of Debris	

7.4 Excavation Slopes, Shoring and Tiebacks

7.4.1 The recommendations included herein are provided for stable excavations. It is the responsibility of the contractor and their competent person to ensure all excavations, temporary slopes and trenches are properly constructed and maintained in accordance with applicable OSHA guidelines in order to maintain safety and the stability of the excavations and adjacent improvements. These excavations should not be allowed to become saturated

or to dry out. Surcharge loads should not be permitted to a distance equal to the height of the excavation from the top of the excavation. The top of the excavation should be a minimum of 15 feet from the edge of existing improvements. Excavations steeper than those recommended or closer than 15 feet from an existing surface improvement should be shored in accordance with applicable OSHA codes and regulations.

- 7.4.2 The stability of the excavations is dependent on the design and construction of the shoring system and site condition. Therefore, Geocon Incorporated cannot be responsible for site safety and the stability of the proposed excavations.
- 7.4.3 The design of temporary shoring is governed by soil and groundwater conditions, and by the depth and width of the excavated area. Continuous support of the excavation face can be provided by a system of soldier piles and wood lagging. Excavations exceeding 15 feet may require soil nails, tieback anchors or internal bracing to provide additional wall restraint.
- 7.4.4 The condition of existing buildings, streets, sidewalks, and other structures/improvements around the perimeter of the planned excavation should be documented prior to the start of shoring and excavation work. Special attention should be given to documenting existing cracks or other indications of differential settlement within these adjacent structures, pavements and other improvements. Underground utilities sensitive to settlement should be videotaped prior to construction to check the integrity of pipes. In addition, monitoring points should be established indicating location and elevation around the excavation and upon existing buildings. These points should be monitored on a weekly basis during excavation work and on a monthly basis thereafter. Inclinometers should be installed and monitored behind any shoring sections that will be advanced deeper than 30 feet below the existing ground surface.
- 7.4.5 In general, ground conditions are moderately suited for soldier pile and tieback anchor wall construction techniques. However, gravel, cobble, and oversized material may be encountered in the existing materials that could be difficult to drill. Additionally, if cohesionless sands are encountered, some raveling may result along the unsupported portions of excavations.
- 7.4.6 Temporary shoring with a level backfill should be designed using a lateral pressure envelope acting on the back of the shoring as presented in Table 7.4.1 assuming a level backfill. The distributions are shown on the Active Pressures for Temporary Shoring. Triangular distribution should be used for cantilevered shoring and, the trapezoidal and rectangular distribution should be used for multi-braced systems such as tieback anchors

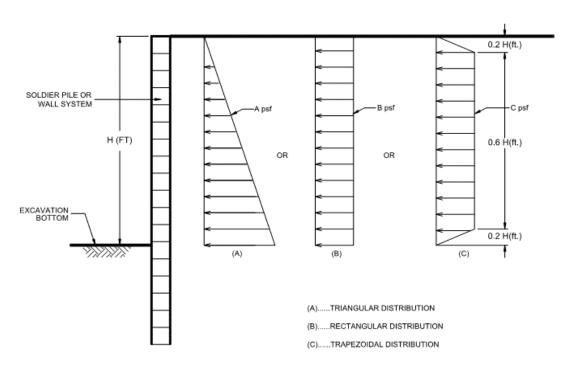
and rakers. The project shoring engineer should determine the applicable soil distribution for the design of the temporary shoring system. Additional lateral earth pressure due to the surcharging effects from construction equipment, sloping backfill, planned stockpiles, adjacent structures and/or traffic loads should be considered, where appropriate, during design of the shoring system.

TABLE 7.4.1
SUMMARY OF TEMPORARY SHORING WALL RECOMMENDATIONS

Parameter	Value
Triangular Distribution, A	29H psf
Rectangular Distribution, B	18H psf
Trapezoidal Distribution, C	23H psf
Passive Pressure, P	375D + 500 psf
Effective Zone Angle, E	30 degrees
Maximum Design Lateral Movement	1 Inch
Maximum Design Vertical Movement	½ Inch
Maximum Design Retained Height, H	30 Feet

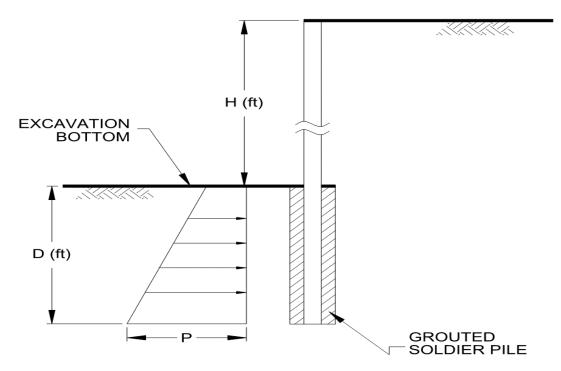
H equals the height of the retaining portion of the wall in feet.

D equals the embedment depth of the retaining wall in feet.



Active Pressures on Temporary Shoring

7.4.7 The passive resistance can be assumed to act over a width of three pile diameters. Typically, soldier piles are embedded a minimum of 0.5 times the maximum height of the excavation (this depth is to include footing excavations) if tieback anchors are not employed. The project structural engineer should determine the actual embedment depth.

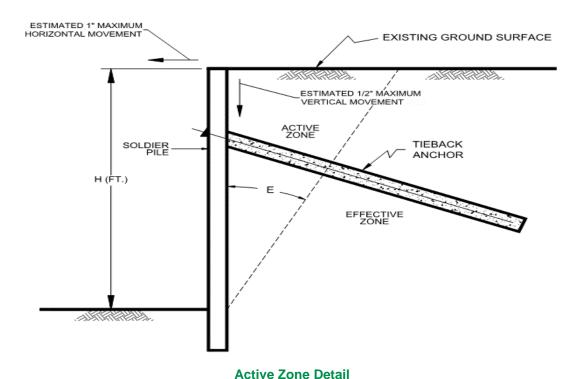


Passive Pressures on Temporary Shoring

- 7.4.8 We should observe the drilled shafts for the soldier piles prior to the placement of steel reinforcement to check that the exposed soil conditions are similar to those expected and that footing excavations have been extended to the appropriate bearing strata and design depths. If unexpected soil conditions are encountered, foundation modifications may be required.
- 7.4.9 Lateral movement of shoring is associated with vertical ground settlement outside of the excavation. Therefore, it is essential that the soldier pile and tieback system allow very limited amounts of lateral displacement. Earth pressures acting on a lagging wall can cause movement of the shoring toward the excavation and result in ground subsidence outside of the excavation. Consequently, horizontal movements of the shoring wall should be accurately monitored and recorded during excavation and anchor construction.
- 7.4.10 Survey points should be established at the top of the pile on at least 20 percent of the soldier piles. An additional point located at an intermediate point between the top of the pile and the base of the excavation should be monitored on at least 20 percent of the piles if

tieback anchors will be used. These points should be monitored on a weekly basis during excavation work and on a monthly basis thereafter until the permanent support system is constructed.

- 7.4.11 The project civil engineer should provide the approximate location, depth, and pipe type of the underground utilities to the shoring engineer to help select the shoring type and shoring design. The shoring system should be designed to limit horizontal soldier pile movement to a maximum of 1 inch. The amount of horizontal deflection can be assumed to be essentially zero along the Active Zone and Effective Zone boundary. The magnitude of movement for intermediate depths and distances from the shoring wall can be linearly interpolated. We understand the City of San Diego may require the developer to prepare a hold harmless agreement for the planned construction operations and development regarding the existing utilities and improvements.
- 7.4.12 Tieback anchors employed in shoring should be designed such that anchors fully penetrate the Active Zone behind the shoring. The Active Zone can be considered the wedge of soil from the face of the shoring to a plane extending upward from the base of the excavation as shown on the Active Zone Detail. Normally, tieback anchors are contractor-designed and installed, and there are numerous anchor construction methods available. Non-shrinkage grout should be used for the construction of the tieback anchors.



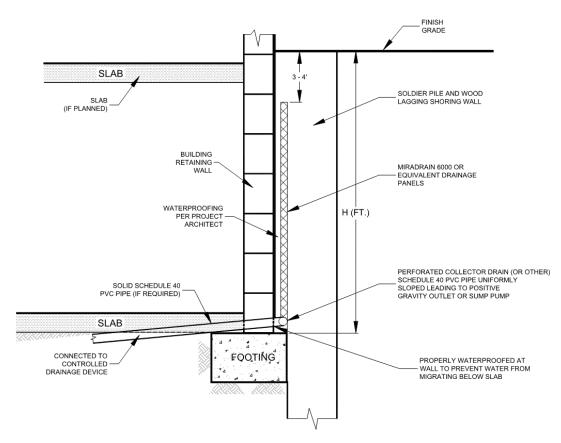
- 7.4.13 Experience has shown that the use of pressure grouting during formation of the bonded portion of the anchor will increase the soil-grout bond stress. A pressure grouting tube should be installed during the construction of the tieback. Post grouting should be performed if adequate capacity cannot be obtained by other construction methods.
- 7.4.14 Anchor capacity is a function of construction method, depth of anchor, batter, diameter of the bonded section and the length of the bonded section. Anchor capacity should be evaluated using the strength parameters shown in Table 7.4.2.

TABLE 7.4.2
SOIL STRENGTH PARAMETERS FOR TEMPORARY SHORING

Description	Cohesion (psf)	Friction Angle (Degrees)
Previously Placed Fill	350	25
Very Old Paralic Deposits	400	31
Scripps Formation	600	34

- 7.4.15 Grout should only be placed in the tieback anchor's bonded section prior to testing. Tieback anchors should be proof-tested to at least 130 percent of the anchor's design working load. Following a successful proof test, the tieback anchors should be locked off at 80 percent of the allowable working load. Tieback anchor test failure criteria should be established in project plans and specifications. The tieback anchor test failure criteria should be based upon a maximum allowable displacement at 130 percent of the anchor's working load (anchor creep) and a maximum residual displacement within the anchor following stressing. Tieback anchor stressing should only be conducted after sufficient hydration has occurred within the grout. Tieback anchors that fail to meet project specified test criteria should be replaced or additional anchors should be constructed.
- 7.4.16 Lagging should keep pace with excavation. The excavation should not be advanced deeper than three feet below the bottom of lagging at any time. These unlagged gaps of up to three feet should only be allowed to stand for short periods of time to help decrease the probability of soil instability and should never be unsupported overnight. Backfilling should be conducted when necessary between the back of lagging and excavation sidewalls to reduce sloughing in this zone and all voids should be filled by the end of each day. Further, the excavation should not be advanced further than four feet below a row of tiebacks prior to those tiebacks being proof tested and locked off unless otherwise specific by the shoring engineer.

- 7.4.17 If tieback anchors are employed, an accurate survey of existing utilities and other underground structures adjacent to the shoring wall should be conducted. The survey should include both locations and depths of existing utilities. Locations of anchors should be adjusted as necessary during the design and construction process to accommodate the existing and proposed utilities.
- 7.4.18 Tieback anchors within the City of San Diego right-of-way should be properly detensioned and removed where steel does not exist within the upper 20 feet from the existing grade. The *Notice Land Development Review/Shoring in City Right-Of-Way*, prepared by the City of San Diego, dated July 1, 2003 should be reviewed and incorporated into the design of the tieback anchors. Procedures for removal of tieback anchors include unscrewing tendons using special couplings, use of explosives, or heat induction. Geocon Incorporated should be consulted if other methods of removal are planned.
- 7.4.19 The shoring system should incorporate a drainage system for the proposed retaining wall as shown herein.



Typical Soldier Pile Wall Drainage Detail

7.5 Soil Nail Wall

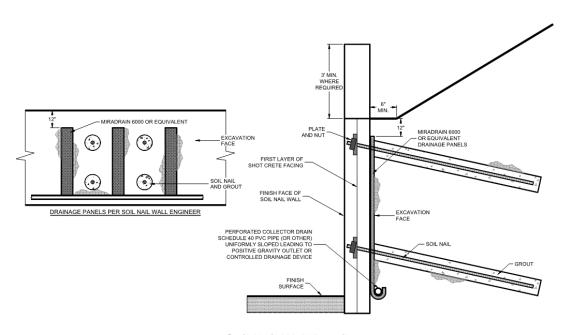
- 7.5.1 As an alternative to temporary shoring followed by construction of a permanent basement wall, a soil nail wall can be used. Soil nail walls consist of installing closely spaced steel bars (nails) into a slope or excavation in a top-down construction sequence. Following installation of a horizontal row of nails, drains, waterproofing and wall reinforcing steel are placed and shotcrete applied to create a final wall. The wall should be designed by an engineer familiar with the design of soil nail walls.
- 7.5.2 Temporary soil nail walls should not be considered a permanent design to support the seismic lateral loads and soil pressures on a building wall. Therefore, the proposed building should be designed to support the expected lateral loads.
- 7.5.3 In general, ground conditions are moderately suited to soil nail wall construction techniques. However, localized gravel, cobble and oversized material could be encountered in the existing materials that could be difficult to drill. Additionally, relatively clean sands may be encountered within the existing soil that may result in some raveling of the unsupported excavation. Casing or specialized drilling techniques should be planned where raveling exists (e.g. casing).
- 7.5.4 Testing of the soil nails should be performed in accordance with the guidelines of the Federal Highway Administration or similar guidelines. At least two verification tests should be performed to confirm design assumptions for each soil/rock type encountered. Verification tests nails should be sacrificial and should not be used to support the proposed wall. The bond length should be adjusted to allow for pullout testing of the verification nails to evaluate the ultimate bond stress. A minimum of 5 percent of the production nails should also be proof tested and a minimum of 4 sacrificial nails should be tested at the discretion of Geocon Incorporated. Consideration should be given to testing sacrificial nails with an adjusted bond length rather than testing production nails. Geocon Incorporated should observe the nail installation and perform the nail testing.
- 7.5.5 The soil strength parameters listed in Table 7.5 can be used in design of the soil nails. The bond stress is dependent on drilling method, diameter, and construction method. Therefore, the designer should evaluate the bond stress based on the existing soil conditions and the construction method.

TABLE 7.5
SOIL STRENGTH PARAMETERS FOR SOIL NAIL WALLS

Description	Cohesion (psf)	Friction Angle (degrees)	Estimated Ultimate Bond Stress (psi)*
Previously Placed Fill	350	25	10
Very Old Paralic Deposits	400	31	20
Scripps Formation	600	34	20

^{*} Assuming gravity fed, open hole drilling techniques.

7.5.6 A wall drain system should be incorporated into the design of the soil nail wall as shown herein. Corrosion protection should be provided for the nails if the wall will be a permanent structure.



Soil Nail Wall Detail

7.6 Seismic Design Criteria

7.6.1 Table 7.6.1 summarizes site-specific design criteria obtained from the 2019 California Building Code (CBC; Based on the 2018 International Building Code [IBC] and ASCE 7-16), Chapter 16 Structural Design, Section 1613 Earthquake Loads. We used the computer program *U.S. Seismic Design Maps*, provided by the Structural Engineers Association (SEA) to calculate the seismic design parameters. The short spectral response uses a period of 0.2 second. We evaluated the Site Class based on the discussion in Section 1613.2.2 of the 2019 CBC and Table 20.3-1 of ASCE 7-16. The values presented herein are for the risk-targeted maximum considered earthquake (MCE_R). Sites designated as Site Class D, E

and F may require additional analyses if requested by the project structural engineer and client.

TABLE 7.6.1
2019 CBC SEISMIC DESIGN PARAMETERS

Parameter	Value	2019 CBC Reference
Site Class	С	Section 1613.2.2
MCE_R Ground Motion Spectral Response Acceleration – Class B (short), S_S	1.224g	Figure 1613.2.1(1)
MCE_R Ground Motion Spectral Response Acceleration – Class B (1 sec), S_1	0.432g	Figure 1613.2.1(2)
Site Coefficient, FA	1.200	Table 1613.2.3(1)
Site Coefficient, F _V	1.500*	Table 1613.2.3(2)
Site Class Modified MCE _R Spectral Response Acceleration (short), S_{MS}	1.469g	Section 1613.2.3 (Eqn 16-36)
Site Class Modified MCE _R Spectral Response Acceleration $-(1 \text{ sec})$, S_{M1}	0.648g*	Section 1613.2.3 (Eqn 16-37)
5% Damped Design Spectral Response Acceleration (short), S _{DS}	0.979g	Section 1613.2.4 (Eqn 16-38)
5% Damped Design Spectral Response Acceleration (1 sec), S _{D1}	0.432g*	Section 1613.2.4 (Eqn 16-39)

^{*} Using the code-based values presented in this table, in lieu of a performing a ground motion hazard analysis, requires the exceptions outlined in ASCE 7-16 Section 11.4.8 be followed by the project structural engineer. Per Section 11.4.8 of ASCE/SEI 7-16, a ground motion hazard analysis should be performed for projects for Site Class "E" sites with Ss greater than or equal to 1.0g and for Site Class "D" and "E" sites with S1 greater than 0.2g. Section 11.4.8 also provides exceptions which indicates that the ground motion hazard analysis may be waived provided the exceptions are followed.

7.6.2 Table 7.6.2 presents the mapped maximum considered geometric mean (MCE_G) seismic design parameters for projects located in Seismic Design Categories of D through F in accordance with ASCE 7-16.

TABLE 7.6.2
ASCE 7-16 PEAK GROUND ACCELERATION

Parameter	Value	ASCE 7-16 Reference
Mapped MCE _G Peak Ground Acceleration, PGA	0.553g	Figure 22-7
Site Coefficient, F _{PGA}	1.200	Table 11.8-1
Site Class Modified MCE _G Peak Ground Acceleration, PGA _M	0.663g	Section 11.8.3 (Eqn 11.8-1)

- 7.6.3 Conformance to the criteria in Tables 7.6.1 and 7.6.2 for seismic design does not constitute any kind of guarantee or assurance that significant structural damage or ground failure will not occur if a large earthquake occurs. The primary goal of seismic design is to protect life, not to avoid all damage, since such design may be economically prohibitive.
- 7.6.4 The project structural engineer and architect should evaluate the appropriate Risk Category and Seismic Design Category for the planned structures. The values presented herein assume a Risk Category of II and resulting in a Seismic Design Category D. Table 7.6.3 presents a summary of the risk categories.

TABLE 7.6.3 ASCE 7-16 RISK CATEGORIES

Risk Category	Building Use	Examples
I	Low risk to Human Life at Failure	Barn, Storage Shelter
II	Nominal Risk to Human Life at Failure (Buildings Not Designated as I, III or IV)	Residential, Commercial and Industrial Buildings
III	Substantial Risk to Human Life at Failure	Theaters, Lecture Halls, Dining Halls, Schools, Prisons, Small Healthcare Facilities, Infrastructure Plants, Storage for Explosives/Toxins
IV	Essential Facilities	Hazardous Material Facilities, Hospitals, Fire and Rescue, Emergency Shelters, Police Stations, Power Stations, Aviation Control Facilities, National Defense, Water Storage

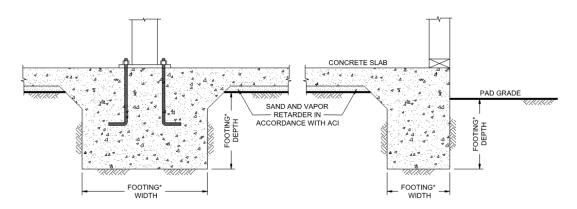
7.7 Building Foundations

7.7.1 The proposed structures can be supported on a shallow foundation system embedded in the formational materials (Very Old Paralic Deposits or Scripps Formation). Foundations for the structure should consist of continuous strip footings and/or isolated spread footings. Footings should be deepened such that the bottom outside edge of the footing is at least 7 feet horizontally from the face of the slope. Table 7.7 provides a summary of the foundation design recommendations.

TABLE 7.7
SUMMARY OF FOUNDATION RECOMMENDATIONS

Parameter	Value	
Minimum Continuous Foundation Width	12 inches	
Minimum Isolated Foundation Width	24 inches	
Minimum Foundation Depth	24 Inches Below Lowest Adjacent Grade	
Minimum Steel Reinforcement	4 No. 5 Bars, 2 at the Top and 2 at the Bottom	
Allowable Bearing Capacity – Formation	6,000 psf	
Province Constitution	500 psf per Foot of Depth	
Bearing Capacity Increase	300 psf per Foot of Width	
Maximum Allowable Bearing Capacity	8,000 psf	
Estimated Total Settlement	1 Inch	
Estimated Differential Settlement	½ Inch in 40 Feet	
Footing Size Used for Settlement	10-Foot Square	
Design Expansion Index	50 or less	

7.7.2 The foundations should be embedded in accordance with the recommendations herein and the Wall/Column Footing Dimension Detail. The embedment depths should be measured from the lowest adjacent pad grade for both interior and exterior footings. Footings should be deepened such that the bottom outside edge of the footing is at least 7 feet horizontally from the face of the slope (unless designed with a post-tensioned foundation system as discussed herein).



Wall/Column Footing Dimension Detail

7.7.3 The bearing capacity values presented herein are for dead plus live loads and may be increased by one-third when considering transient loads due to wind or seismic forces.

- 7.7.4 Deepening of footings will be required where the bottom of the footing does not expose formational materials. We expect this will be necessary on the eastern 30 to 40 feet of Building B where fill soils will be placed to achieve finish grade. As an alternative to deepening footings, overexcavation of the bottom of the footing and replacement with slurry can be performed in areas where formational materials are not encountered at the bottom of the footing. Minimum two-sack slurry can be placed in the footing excavations for the conventional foundations to the bottom of proposed footing elevation.
- 7.7.5 Where buildings or other improvements are planned near the top of a slope steeper than 3:1 (horizontal to vertical), special foundations and/or design considerations are recommended due to the tendency for lateral soil movement to occur.
 - For fill slopes less than 20 feet high, building footings should be deepened such that the bottom outside edge of the footing is at least 7 feet horizontally from the face of the slope.
 - When located next to a descending 3:1 (horizontal to vertical) fill slope or steeper, the foundations should be extended to a depth where the minimum horizontal distance is equal to H/3 (where H equals the vertical distance from the top of the fill slope to the base of the fill soil) with a minimum of 7 feet but need not exceed 40 feet. The horizontal distance is measured from the outer, deepest edge of the footing to the face of the slope. An acceptable alternative to deepening the footings would be the use of a post-tensioned slab and foundation system or increased footing and slab reinforcement. Specific design parameters or recommendations for either of these alternatives can be provided once the building location and fill slope geometry have been determined.
 - Although other improvements, which are relatively rigid or brittle, such as concrete flatwork or masonry walls, may experience some distress if located near the top of a slope, it is generally not economical to mitigate this potential. It may be possible, however, to incorporate design measures that would permit some lateral soil movement without causing extensive distress. Geocon Incorporated should be consulted for specific recommendations.
- 7.7.6 We should observe the foundation excavations prior to the placement of reinforcing steel and concrete to check that the exposed soil conditions are similar to those expected and that they have been extended to the appropriate bearing strata. Foundation modifications may be required if unexpected soil conditions are encountered.
- 7.7.7 Geocon Incorporated should be consulted to provide additional design parameters as required by the structural engineer.

7.8 Concrete Slabs-On-Grade

7.8.1 Concrete slabs-on-grade for the structures should be constructed in accordance with Table 7.8.

TABLE 7.8
MINIMUM CONCRETE SLAB-ON-GRADE RECOMMENDATIONS

Parameter	Value		
Minimum Concrete Slab Thickness	4 inches		
Minimum Steel Reinforcement	No. 3 Bars 18 Inches on Center, Both Directions		
Typical Slab Underlayment	3 to 4 Inches of Sand/Gravel/Base		
Design Expansion Index	50 or less		

- Slabs that may receive moisture-sensitive floor coverings or may be used to store moisture-sensitive materials should be underlain by a vapor retarder. The vapor retarder design should be consistent with the guidelines presented in the American Concrete Institute's (ACI) *Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials* (ACI 302.2R-06). In addition, the membrane should be installed in accordance with manufacturer's recommendations and ASTM requirements and installed in a manner that prevents puncture. The vapor retarder used should be specified by the project architect or developer based on the type of floor covering that will be installed and if the structure will possess a humidity controlled environment.
- 7.8.3 The bedding sand thickness should be determined by the project foundation engineer, architect, and/or developer. It is common to have 3 to 4 inches of sand for 5-inch and 4-inch thick slabs, respectively, in the southern California region. However, we should be contacted to provide recommendations if the bedding sand is thicker than 6 inches. The foundation design engineer should provide appropriate concrete mix design criteria and curing measures to assure proper curing of the slab by reducing the potential for rapid moisture loss and subsequent cracking and/or slab curl. We suggest that the foundation design engineer present the concrete mix design and proper curing methods on the foundation plans. It is critical that the foundation contractor understands and follows the recommendations presented on the foundation plans.
- 7.8.4 Concrete slabs should be provided with adequate crack-control joints, construction joints and/or expansion joints to reduce unsightly shrinkage cracking. The design of joints should consider criteria of the American Concrete Institute (ACI) when establishing crack-control spacing. Crack-control joints should be spaced at intervals no greater than 12 feet. Additional steel reinforcing, concrete admixtures and/or closer crack control joint spacing should be considered where concrete-exposed finished floors are planned.

- 7.8.5 Special subgrade presaturation is not deemed necessary prior to placing concrete; however, the exposed foundation and slab subgrade soil should be moisturized to maintain a moist condition as would be expected in any such concrete placement.
- 7.8.6 The concrete slab-on-grade recommendations are based on soil support characteristics only. The project structural engineer should evaluate the structural requirements of the concrete slabs for supporting expected loads.
- 7.8.7 The recommendations of this report are intended to reduce the potential for cracking of slabs due to expansive soil (if present), differential settlement of existing soil or soil with varying thicknesses. However, even with the incorporation of the recommendations presented herein, foundations, stucco walls, and slabs-on-grade placed on such conditions may still exhibit some cracking due to soil movement and/or shrinkage. The occurrence of concrete shrinkage cracks is independent of the supporting soil characteristics. Their occurrence may be reduced and/or controlled by limiting the slump of the concrete, proper concrete placement and curing, and by the placement of crack control joints at periodic intervals, in particular, where re-entrant slab corners occur.

7.9 Exterior Concrete Flatwork

7.9.1 Exterior concrete flatwork not subject to vehicular traffic should be constructed in accordance with the recommendations presented in Table 7.9. The recommended steel reinforcement would help reduce the potential for cracking.

TABLE 7.9
MINIMUM CONCRETE FLATWORK RECOMMENDATIONS

Expansion Index, EI	Minimum Steel Reinforcement* Options	Minimum Thickness	
FI . 00	6x6-W2.9/W2.9 (6x6-6/6) welded wire mesh	4 Inches	
EI ≤ 90	No. 3 Bars 18 inches on center, Both Directions		

^{*} In excess of 8 feet square.

7.9.2 Even with the incorporation of the recommendations of this report, the exterior concrete flatwork has a potential to experience some uplift due to expansive soil beneath grade. The steel reinforcement should overlap continuously in flatwork to reduce the potential for vertical offsets within flatwork. Additionally, flatwork should be structurally connected to the curbs, where possible, to reduce the potential for offsets between the curbs and the flatwork.

- 7.9.3 Concrete flatwork should be provided with crack control joints to reduce and/or control shrinkage cracking. Crack control spacing should be determined by the project structural engineer based upon the slab thickness and intended usage. Criteria of the American Concrete Institute (ACI) should be taken into consideration when establishing crack control spacing. Subgrade soil for exterior slabs not subjected to vehicle loads should be compacted in accordance with criteria presented in the grading section prior to concrete placement. Subgrade soil should be properly compacted and the moisture content of subgrade soil should be verified prior to placing concrete. Base materials will not be required below concrete improvements.
- 7.9.4 Where exterior flatwork abuts the structure at entrant or exit points, the exterior slab should be dowelled into the structure's foundation stemwall. This recommendation is intended to reduce the potential for differential elevations that could result from differential settlement or minor heave of the flatwork. Dowelling details should be designed by the project structural engineer.
- 7.9.5 The recommendations presented herein are intended to reduce the potential for cracking of exterior slabs as a result of differential movement. However, even with the incorporation of the recommendations presented herein, slabs-on-grade will still crack. The occurrence of concrete shrinkage cracks is independent of the soil supporting characteristics. Their occurrence may be reduced and/or controlled by limiting the slump of the concrete, the use of crack control joints and proper concrete placement and curing. Crack control joints should be spaced at intervals no greater than 12 feet. Literature provided by the Portland Concrete Association (PCA) and American Concrete Institute (ACI) present recommendations for proper concrete mix, construction, and curing practices, and should be incorporated into project construction.

7.10 Retaining Walls

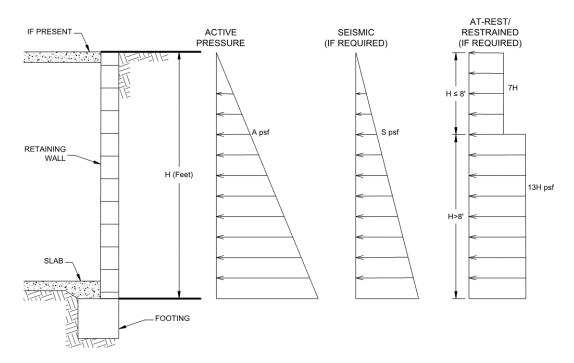
7.10.1 Retaining walls should be designed using the values presented in Table 7.10.1. Soil with an expansion index (EI) of greater than 50 should not be used as backfill material behind retaining walls.

TABLE 7.10.1
RETAINING WALL DESIGN RECOMMENDATIONS

Parameter	Value
Active Soil Pressure, A (Fluid Density, Level Backfill)	35 pcf
Active Soil Pressure, A (Fluid Density, 2:1 Sloping Backfill)	50 pcf
Seismic Pressure, S	15H psf
At-Rest/Restrained Walls Additional Uniform Pressure (0 to 8 Feet High)	7H psf
At-Rest/Restrained Walls Additional Uniform Pressure (8+ Feet High)	13H psf
Expected Expansion Index for the Subject Property	EI <u><</u> 50

H equals the height of the retaining portion of the wall.

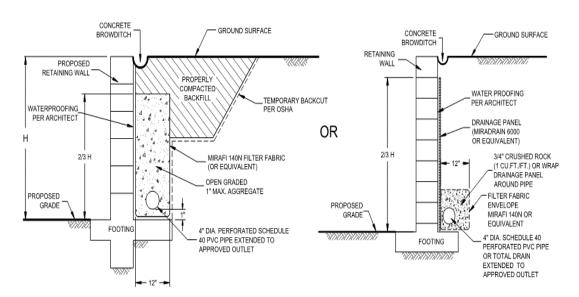
7.10.2 The project retaining walls should be designed as shown in the Retaining Wall Loading Diagram.



Retaining Wall Loading Diagram

7.10.3 Unrestrained walls are those that are allowed to rotate more than 0.001H (where H equals the height of the retaining portion of the wall) at the top of the wall. Where walls are restrained from movement at the top (at-rest condition), an additional uniform pressure should be applied to the wall. For retaining walls subject to vehicular loads within a horizontal distance equal to two-thirds the wall height, a surcharge equivalent to 2 feet of fill soil should be added.

- 7.10.4 The structural engineer should determine the Seismic Design Category for the project in accordance with Section 1613.2.5 of the 2019 CBC or Section 11.6 of ASCE 7-16. For structures assigned to Seismic Design Category of D, E, or F, retaining walls that support more than 6 feet of backfill should be designed with seismic lateral pressure in accordance with Section 1803.5.12 of the 2019 CBC. The seismic load is dependent on the retained height where H is the height of the wall, in feet, and the calculated loads result in pounds per square foot (psf) exerted at the base of the wall and zero at the top of the wall.
- 7.10.5 Retaining walls should be designed to ensure stability against overturning sliding, and excessive foundation pressure. Where a keyway is extended below the wall base with the intent to engage passive pressure and enhance sliding stability, it is not necessary to consider active pressure on the keyway.
- 7.10.6 Drainage openings through the base of the wall (weep holes) should not be used where the seepage could be a nuisance or otherwise adversely affect the property adjacent to the base of the wall. The recommendations herein assume a properly compacted granular (EI of 50 or less) free-draining backfill material with no hydrostatic forces or imposed surcharge load. The retaining wall should be properly drained as shown in the Typical Retaining Wall Drainage Detail. If conditions different than those described are expected, or if specific drainage details are desired, Geocon Incorporated should be contacted for additional recommendations.



Typical Retaining Wall Drainage Detail

7.10.7 The retaining walls may be designed using either the active and restrained (at-rest) loading condition or the active and seismic loading condition as suggested by the structural

engineer. Typically, it appears the design of the restrained condition for retaining wall loading may be adequate for the seismic design of the retaining walls. However, the active earth pressure combined with the seismic design load should be reviewed and also considered in the design of the retaining walls.

7.10.8 In general, wall foundations having should be designed in accordance with Table 7.10.2. The proximity of the foundation to the top of a slope steeper than 3:1 could impact the allowable soil bearing pressure. Therefore, retaining wall foundations should be deepened such that the bottom outside edge of the footing is at least 7 feet horizontally from the face of the slope.

TABLE 7.10.2
SUMMARY OF RETAINING WALL FOUNDATION RECOMMENDATIONS

Parameter	Value		
Minimum Retaining Wall Foundation Width	12 inches		
Minimum Retaining Wall Foundation Depth	12 Inches		
Minimum Steel Reinforcement	Per Structural Engineer		
Maximum Allowable Bearing Capacity	2,000 psf		
Estimated Total Settlement	1 Inch		
Estimated Differential Settlement	1/2 Inch in 40 Feet		

- 7.10.9 The recommendations presented herein are generally applicable to the design of rigid concrete or masonry retaining walls. In the event that other types of walls (such as mechanically stabilized earth [MSE] walls, soil nail walls, or soldier pile walls) are planned, Geocon Incorporated should be consulted for additional recommendations.
- 7.10.10 Unrestrained walls will move laterally when backfilled and loading is applied. The amount of lateral deflection is dependent on the wall height, the type of soil used for backfill, and loads acting on the wall. The retaining walls and improvements above the retaining walls should be designed to incorporate an appropriate amount of lateral deflection as determined by the structural engineer.
- 7.10.11 Soil contemplated for use as retaining wall backfill, including import materials, should be identified in the field prior to backfill. At that time, Geocon Incorporated should obtain samples for laboratory testing to evaluate its suitability. Modified lateral earth pressures may be necessary if the backfill soil does not meet the required expansion index or shear strength. City or regional standard wall designs, if used, are based on a specific active lateral earth pressure and/or soil friction angle. In this regard, on-site soil to be used as

backfill may or may not meet the values for standard wall designs. Geocon Incorporated should be consulted to assess the suitability of the on-site soil for use as wall backfill if standard wall designs will be used.

7.11 Lateral Loading

7.11.1 Table 7.11 should be used to help design the proposed structures and improvements to resist lateral loads for the design of footings or shear keys. The allowable passive pressure assumes a horizontal surface extending at least 5 feet, or three times the surface generating the passive pressure, whichever is greater. The upper 12 inches of material in areas not protected by floor slabs or pavement should not be included in design for passive resistance.

TABLE 7.11
SUMMARY OF LATERAL LOAD DESIGN RECOMMENDATIONS

Parameter	Value	
Passive Pressure Fluid Density	350 pcf	
Coefficient of Friction (Concrete and Soil)	0.35	
Coefficient of Friction (Along Vapor Barrier)	0.2 to 0.25*	

^{*} Per manufacturer's recommendations.

7.11.2 The passive and frictional resistant loads can be combined for design purposes. The lateral passive pressures may be increased by one-third when considering transient loads due to wind or seismic forces.

7.12 Preliminary Pavement Recommendations

7.12.1 We calculated the flexible pavement sections in general conformance with the *Caltrans Method of Flexible Pavement Design* (Highway Design Manual, Section 608.4) using an estimated Traffic Index (TI) of 5.0, 5.5, 6.0, and 7.0 for parking stalls, driveways, medium truck traffic areas, and heavy truck traffic areas, respectively. The project civil engineer and owner should review the pavement designations to determine appropriate locations for pavement thickness. The final pavement sections for the parking lot should be based on the R-Value of the subgrade soil encountered at final subgrade elevation. We have assumed an R-Value of 7 and 78 for the subgrade soil and base materials, respectively, for the purposes of this preliminary analysis. Table 7.12.1 presents the preliminary flexible pavement sections.

TABLE 7.12.1
PRELIMINARY FLEXIBLE PAVEMENT SECTION

Location	Assumed Traffic Index	Assumed Subgrade R-Value	Asphalt Concrete (inches)	Class 2 Aggregate Base (inches)
Parking stalls for automobiles and light-duty vehicles	5.0	7	3	10
Driveways for automobiles and light-duty vehicles	5.5	7	3	12
Medium truck traffic areas	6.0	7	3.5	13
Driveways for heavy truck traffic	7.0	7	4	15

- 7.12.2 Prior to placing base materials, the upper 12 inches of the subgrade soil should be scarified, moisture conditioned as necessary, and recompacted to a dry density of at least 95 percent of the laboratory maximum dry density near to slightly above optimum moisture content as determined by ASTM D 1557. Similarly, the base material should be compacted to a dry density of at least 95 percent of the laboratory maximum dry density near to slightly above optimum moisture content. Asphalt concrete should be compacted to a density of at least 95 percent of the laboratory Hveem density in accordance with ASTM D 2726.
- 7.12.3 A rigid Portland cement concrete (PCC) pavement section should be placed in roadway aprons and cross gutters. We calculated the rigid pavement section in general conformance with the procedure recommended by the American Concrete Institute report ACI 330R-08 Guide for Design and Construction of Concrete Parking Lots using the parameters presented in Table 7.12.2.

TABLE 7.12.2
RIGID PAVEMENT DESIGN PARAMETERS

Design Parameter	Design Value	
Modulus of subgrade reaction, k	50 pci	
Modulus of rupture for concrete, M_R	500 psi	
Traffic Category, TC	A and C	
Average daily truck traffic, ADTT	10 and 100	

7.12.4 Based on the criteria presented herein, the PCC pavement sections should have a minimum thickness as presented in Table 7.12.3.

TABLE 7.12.3
RIGID VEHICULAR PAVEMENT RECOMMENDATIONS

Location	Portland Cement Concrete (inches)
Automobile Parking Stalls (TC=A)	6.0
Driveways (TC=C)	7.5

- 7.12.5 The PCC vehicular pavement should be placed over subgrade soil that is compacted to a dry density of at least 95 percent of the laboratory maximum dry density near to slightly above optimum moisture content. This pavement section is based on a minimum concrete compressive strength of approximately 3,000 psi (pounds per square inch).
- 7.12.6 A thickened edge or integral curb should be constructed on the outside of concrete slabs subjected to wheel loads. The thickened edge should be 1.2 times the slab thickness or a minimum thickness of 2 inches, whichever results in a thicker edge, and taper back to the recommended slab thickness 4 feet behind the face of the slab (e.g., 6-inch and 7.5-inchthick slabs would have an 8- and 9.5-inch-thick edge, respectively). Reinforcing steel will not be necessary within the concrete for geotechnical purposes with the possible exception of dowels at construction joints as discussed herein.
- 7.12.7 To control the location and spread of concrete shrinkage cracks, crack-control joints (weakened plane joints) should be included in the design of the concrete pavement slab. Crack-control joints should not exceed 30 times the slab thickness with a maximum spacing of 15 feet for the 6.0-inch and thicker slabs and should be sealed with an appropriate sealant to prevent the migration of water through the control joint to the subgrade materials. The depth of the crack-control joints should be determined by the referenced ACI report. The depth of the crack-control joints should be at least ¼ of the slab thickness when using a conventional saw, or at least 1 inch when using early-entry saws on slabs 9 inches or less in thickness, as determined by the referenced ACI report discussed in the pavement section herein. Cuts at least ¼ inch wide are required for sealed joints, and a 3/8 inch wide cut is commonly recommended. A narrow joint width of 1/10- to 1/8-inch wide is common for unsealed joints.
- 7.12.8 To provide load transfer between adjacent pavement slab sections, a butt-type construction joint should be constructed. The butt-type joint should be thickened by at least 20 percent at the edge and taper back at least 4 feet from the face of the slab. As an alternative to the butt-type construction joint, dowelling can be used between construction joints for pavements of 7 inches or thicker. As discussed in the referenced ACI guide, dowels should consist of smooth, 1-inch-diameter reinforcing steel 14 inches long embedded a minimum

of 6 inches into the slab on either side of the construction joint. Dowels should be located at the midpoint of the slab, spaced at 12 inches on center and lubricated to allow joint movement while still transferring loads. In addition, tie bars should be installed as recommended in Section 3.8.3 of the referenced ACI guide. The structural engineer should provide other alternative recommendations for load transfer.

7.12.9 Concrete curb/gutter should be placed on soil subgrade compacted to a dry density of at least 90 percent of the laboratory maximum dry density near to slightly above optimum moisture content. Cross-gutters that receives vehicular should be placed on subgrade soil compacted to a dry density of at least 95 percent of the laboratory maximum dry density near to slightly above optimum moisture content. Base materials should not be placed below the curb/gutter, or cross-gutters so water is not able to migrate from the adjacent parkways to the pavement sections. Where flatwork is located directly adjacent to the curb/gutter, the concrete flatwork should be structurally connected to the curbs to help reduce the potential for offsets between the curbs and the flatwork.

7.13 Interlocking Pervious Concrete Paver Recommendations

- 7.13.1 We understand vehicular pervious concrete pavers may be used at the site. The concrete vehicular paver thickness should not be less than 31% inches. The pavers should be installed and maintained in accordance with the manufacturer's recommendations. In addition, the concrete pavers should be installed in a pattern acceptable for vehicular traffic. A subdrain should be installed within the base materials at the low point of the subgrade as discussed herein.
- 7.13.2 We calculated the concrete paver pavement sections in general conformance with the Caltrans Method of Flexible Pavement Design (Highway Design Manual, Section 608.4). We used an R-Value of 7 for the subgrade soil for our analysis and an R-Value of 78 for the base materials per Caltrans specifications.
- 7.13.3 We understand that Class 2 aggregate base may be placed below the concrete pavers. We calculated the base section based on an equivalent asphalt concrete section equal to the thickness of the concrete vehicular paver (about 3 inches or 80 mm) in accordance with the Interlocking Concrete Pavement Institute, *Tech Spec Number 4*. The paver pavement sections can be increased as required by manufacturer's recommendations. Table 7.13 presents the recommended interlocking paver pavement sections.

TABLE 7.13
INTERLOCKING PAVER PAVEMENT SECTIONS

Location	Traffic Index	Subgrade R-Value	Estimated Paver Thickness (inches)	Bedding Sand Thickness (inches)	Minimum Class 2 Aggregate Base Thickness (inches)
Parking Stalls	5.0	7	31/8	1-2	10
Driveway	6.0	7	31/8	1-2	13

- 7.13.4 Prior to placing base materials, the upper 12 inches of the subgrade soil should be scarified, moisture conditioned as necessary, and recompacted to a dry density of at least 95 percent of the laboratory maximum dry density near to slightly above optimum moisture content as determined by ASTM D 1557. Similarly, the base material should be compacted to a dry density of at least 95 percent of the laboratory maximum dry density near to slightly above optimum moisture content.
- 7.13.5 The property owner should be informed by the manufacturer of their responsibility for the paver maintenance program. In addition, pavers tend to shift vertically and horizontally during the life of the pavement and should be expected. The pavers normally require a concrete border to reduce the magnitude of lateral movement from traffic. The concrete border surrounding the pavers should be embedded at least 6 inches from finish grade surface. We understand that the space between concrete pavers will be pervious to allow water infiltration into the underlying base materials. The recommendations for draining the base of water as discussed herein should be included in design.
- 7.13.6 Concrete pedestrian pavers can be used at the site as long as surface runoff is not concentrated toward the permeable paver areas. The pedestrian concrete pavers can also be designed as permeable if desired with the addition of a subdrain placed within the base. Therefore, the bottom of permeable paver areas do not need to be lined.
- 7.13.7 Based on the Interlocking Concrete Pavement Institute (ICPI), the pedestrian pavers should possess a minimum thickness of 60 millimeters overlying 1 to 1½ inch of sand. The sand should be underlain by at least 4 inches of Class 2 aggregate base or #57 aggregate in accordance with ASTM C 33 and in accordance with the manufacturer's recommendations. The aggregate section can be thickened to increase the water capacity as required by the project civil engineer.

- 7.13.8 Prior to placing aggregate materials, the subgrade soil should be scarified, moisture conditioned as necessary, and recompacted to a dry density of at least 90 percent of the laboratory maximum dry density near to slightly above optimum moisture content as determined by ASTM D 1557. The depth of compaction should be at least 12 inches. Similarly, the aggregate base materials should be compacted to a dry density of at least 95 percent of the laboratory maximum dry density near to slightly above optimum moisture content.
- 7.13.9 The subgrade of the pervious pavers should be graded to allow water to flow to a subdrain at a minimum gradient of 2 percent. A subdrain should be installed within the base materials at the low point of the subgrade to reduce the potential for water to build up within the paving section. The subdrain can be elevated above the subgrade a maximum of 3 inches within the base section. The subdrain should be connected to an approved drainage device. The subdrain should consist of at least 3-inch diameter perforated Schedule 40, PVC pipe.
- 7.13.10 A continuous impermeable liner or rigid concrete cutoff wall should be installed along the sides of the pervious paver section to prevent water migration. The sidewall liner is not required if the concrete border wall is installed to an elevation of the bottom of the base materials. The sidewall liner should consist of a high density polyethylene (HDPE) with a minimum thickness of 15 mil or equivalent with the liner or concrete cutoff wall extending to the subgrade elevation. The liner/barrier should be sealed at the connections in accordance with manufacturer recommendations and should be properly waterproofed at the drain connection.
- 7.13.11 The performance of pavement is highly dependent on providing positive surface drainage away from the edge of the pavement. Ponding of water on or adjacent to the pavement will likely result in pavement distress and subgrade failure. Drainage from landscaped areas should be directed to controlled drainage structures. Landscape areas adjacent to the edge of asphalt pavements are not recommended due to the potential for surface or irrigation water to infiltrate the underlying permeable aggregate base and cause distress. Where such a condition cannot be avoided, consideration should be given to incorporating measures that will significantly reduce the potential for subsurface water migration into the aggregate base. If planter islands are planned, the perimeter curb should extend at least 6 inches below the level of the base materials.

7.14 Site Drainage and Moisture Protection

7.14.1 Adequate site drainage is critical to reduce the potential for differential soil movement, erosion and subsurface seepage. Under no circumstances should water be allowed to pond adjacent to footings. The site should be graded and maintained such that surface drainage is

directed away from structures in accordance with 2019 CBC 1804.4 or other applicable standards. In addition, surface drainage should be directed away from the top of slopes into swales or other controlled drainage devices. Roof and pavement drainage should be directed into conduits that carry runoff away from the proposed structure.

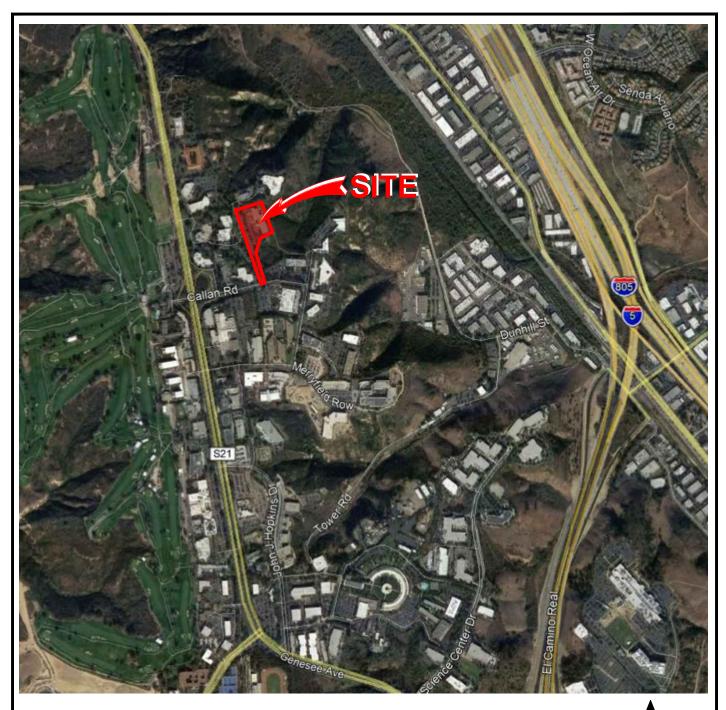
- 7.14.2 In the case of basement walls or building walls retaining landscaping areas, a water-proofing system should be used on the wall and joints, and a Miradrain drainage panel (or similar) should be placed over the waterproofing. The project architect or civil engineer should provide detailed specifications on the plans for all waterproofing and drainage.
- 7.14.3 Underground utilities should be leak free. Utility and irrigation lines should be checked periodically for leaks, and detected leaks should be repaired promptly. Detrimental soil movement could occur if water is allowed to infiltrate the soil for prolonged periods of time.
- 7.14.4 Landscaping planters adjacent to paved areas are not recommended due to the potential for surface or irrigation water to infiltrate the pavement's subgrade and base course. Area drains to collect excess irrigation water and transmit it to drainage structures or impervious above-grade planter boxes can be used. In addition, where landscaping is planned adjacent to the pavement, construction of a cutoff wall along the edge of the pavement that extends at least 6 inches below the bottom of the base material should be considered.

7.15 Grading and Foundation Plan Review

7.15.1 Geocon Incorporated should review the grading and building foundation plans for the project prior to final design submittal to evaluate if additional analyses and/or recommendations are required.

LIMITATIONS AND UNIFORMITY OF CONDITIONS

- 1. The firm that performed the geotechnical investigation for the project should be retained to provide testing and observation services during construction to provide continuity of geotechnical interpretation and to check that the recommendations presented for geotechnical aspects of site development are incorporated during site grading, construction of improvements, and excavation of foundations. If another geotechnical firm is selected to perform the testing and observation services during construction operations, that firm should prepare a letter indicating their intent to assume the responsibilities of project geotechnical engineer of record. A copy of the letter should be provided to the regulatory agency for their records. In addition, that firm should provide revised recommendations concerning the geotechnical aspects of the proposed development, or a written acknowledgement of their concurrence with the recommendations presented in our report. They should also perform additional analyses deemed necessary to assume the role of Geotechnical Engineer of Record.
- 2. The recommendations of this report pertain only to the site investigated and are based upon the assumption that the soil conditions do not deviate from those disclosed in the investigation. If any variations or undesirable conditions are encountered during construction, or if the proposed construction will differ from that anticipated herein, Geocon Incorporated should be notified so that supplemental recommendations can be given. The evaluation or identification of the potential presence of hazardous or corrosive materials was not part of the scope of services provided by Geocon Incorporated.
- 3. This report is issued with the understanding that it is the responsibility of the owner or his representative to ensure that the information and recommendations contained herein are brought to the attention of the architect and engineer for the project and incorporated into the plans, and the necessary steps are taken to see that the contractor and subcontractors carry out such recommendations in the field.
- 4. The findings of this report are valid as of the present date. However, changes in the conditions of a property can occur with the passage of time, whether they be due to natural processes or the works of man on this or adjacent properties. In addition, changes in applicable or appropriate standards may occur, whether they result from legislation or the broadening of knowledge. Accordingly, the findings of this report may be invalidated wholly or partially by changes outside our control. Therefore, this report is subject to review and should not be relied upon after a period of three years.



THE GEOGRAPHICAL INFORMATION MADE AVAILABLE FOR DISPLAY WAS PROVIDED BY GOOGLE EARTH, SUBJECT TO A LICENSING AGREEMENT. THE INFORMATION IS FOR ILLUSTRATIVE PURPOSES ONLY; IT IS NOT INTENDED FOR CLIENT'S USE OR RELIANCE AND SHALL NOT BE REPRODUCED BY CLIENT. CLIENT SHALL INDEMNIFY, DEFEND AND HOLD HARMLESS GEOCON FROM ANY LIABILITY INCURRED AS A RESULT OF SUCH USE OR RELIANCE BY CLIENT.



VICINITY MAP

GEOCON INCORPORATED



GEOTECHNICAL ■ ENVIRONMENTAL ■ MATERIALS 6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121 - 2974 PHONE 858 558-6900 - FAX 858 558-6159

LR / RA

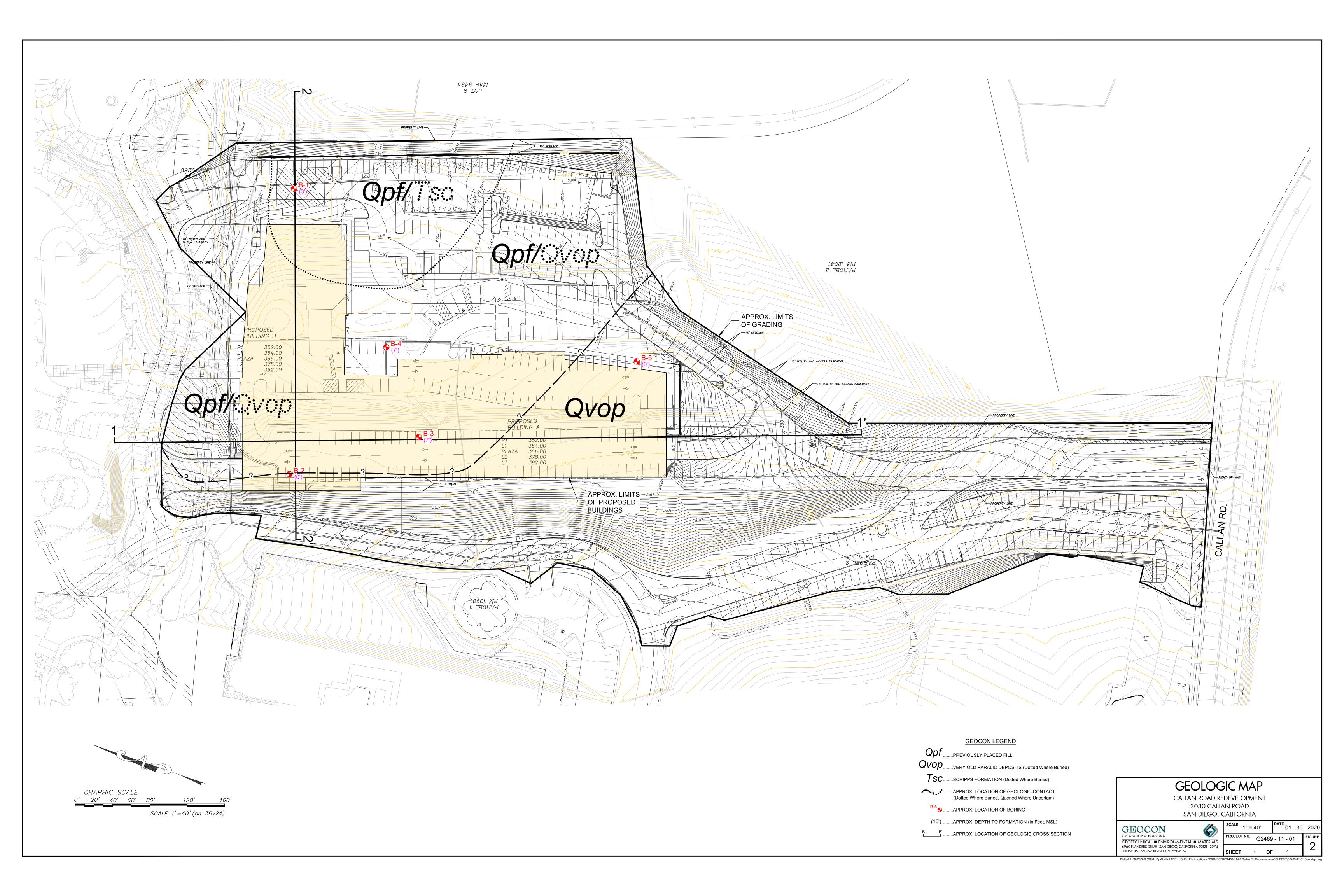
DSK/GTYPD

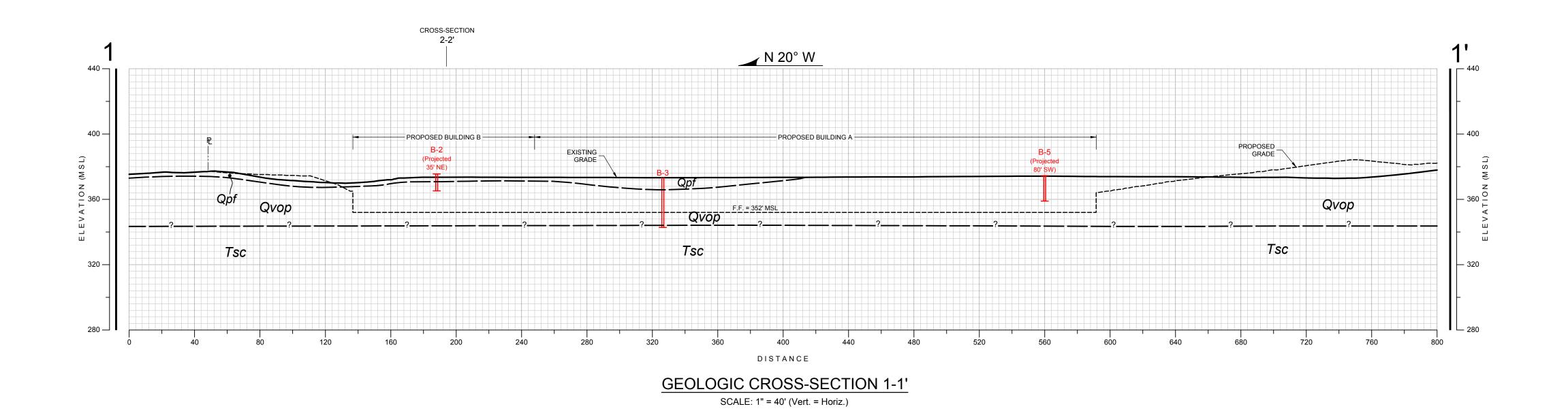
CALLAN ROAD REDEVELOPMENT 3030 CALLAN ROAD SAN DIEGO, CALIFORNIA

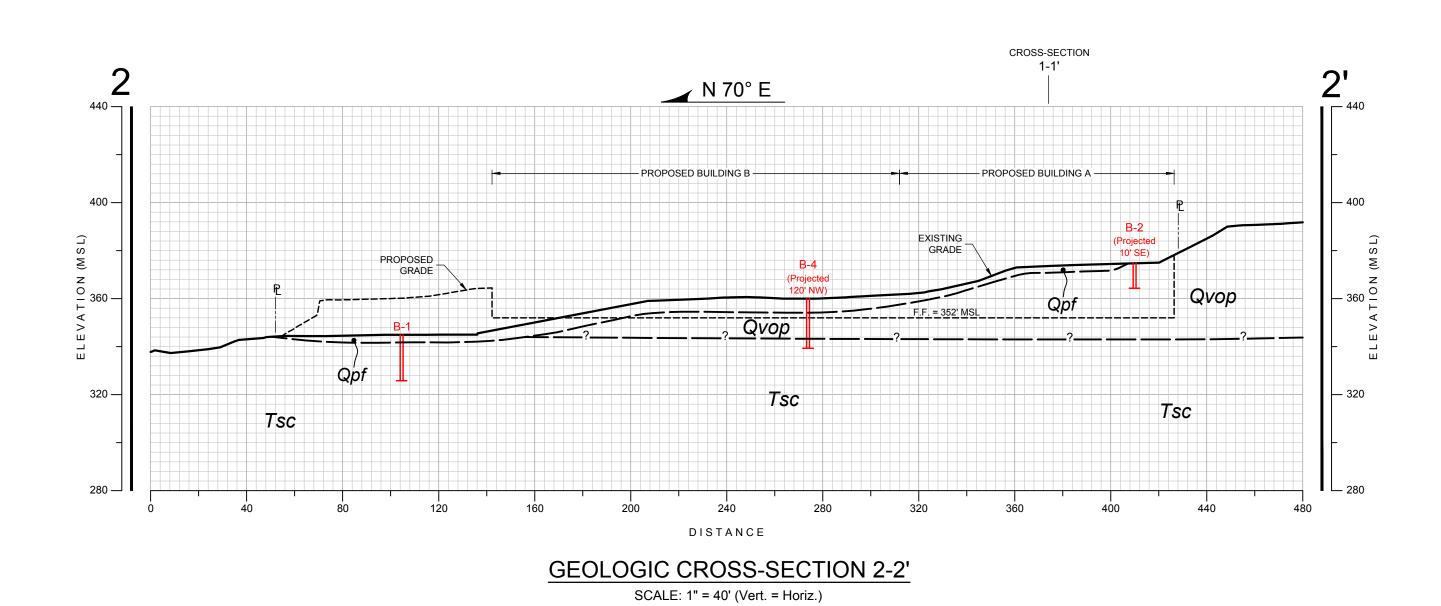
DATE 01 - 30 - 2020

PROJECT NO. G2469 - 11 - 01

FIG. 1







GEOCON LEGEND

Qpf......PREVIOUSLY PLACED FILL
QVOP.....VERY OLD PARALIC DEPOSITS

Tsc.....SCRIPPS FORMATION

B-5APPROX. LOCATION OF BORING

GEOLOGIC CROSS SECTION

CALLAN ROAD REDEVELOPMENT 3030 CALLAN ROAD SAN DIEGO, CALIFORNIA

SCALI	GEOCON (S)
PROJE	INCORPORATED
IALS	GEOTECHNICAL ■ ENVIRONMENTAL ■ MATERIALS
2974 SHFF	6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121 - 2974 PHONE 858 558-6900 - FAX 858 558-6159

SCALE 1" = 40'

PROJECT NO. G2469 - 11 - 01

SHEET 1 OF 1

CCTS\G2469-11-01 Callan Rd Redevelopment\SHEETS\G2469-11-01 XSection.dwg

Surficial Slope Stability Evaluation

Slope Height, H (feet)	∞	
Vertical Depth of Stauration, Z (feet)	3	
Slope Inclination	2.00	:1
Slope Inclination, I (degrees)	26.6	
Unit Weight of Water, γW (pcf)	62.4	
Total Unit Weight of Soil, γ_T (pcf)	120	
Friction Angle, φ (degrees)	28	
Cohesion, C (psf)	200	
Factor of Safety = $(C+(\gamma_T-\gamma_W)Z \cos^2 i \tanh \phi)/(\gamma_T Z \sin i \cos i)$	1.90	

References: (1) Haefeli, R. The Stability of Slopes Acted Upon by Parallel Seepage, Proc. Second International Conference, SMFE, Rotterdam, 1948, 1, 57-62.

> (2) Skempton, A. W., and F. A. Delory, Stability of Natural Slopes in London Clay, Proc. Fourth International Conference, SMFE, London, 1957, 2, 378-81.

Slope Stability Evaluation

Slope Height, H (feet)	20
Slope Inclination	2.0 :1
Total Unit Weight of Soil, γ_T (pcf)	120
Friction Angle, φ (degrees)	28
Cohesion, C (psf)	200
$\gamma_{C\phi} = (\gamma H tan \phi)/C$	6.4
N _{Cf} (from Chart)	25
Factor of Safety = $(N_{Cf}C)/(\gamma H)$	2.08

References: (1) Janbu, N. Stability Analysis of Slopes with Dimensionless Parameters, Harvard Soil Mechanics, Series No. 46, 1954.

> (2) Janbu, N. Discussion of J.M. Bell, DimensionlessParameters for Homogeneous Earth Slopes, Journal of Soil Mechanics and Foundation Design, No. SM6, November 1967.



SLOPE STABILITY ANALYSIS - FILL SLOPES

CALLAN ROAD REDEVELOPMENT 3030 CALLAN ROAD SAN DIEGO, CALIFORNIA

DATE 01-30-2020 PROJECT NO. G2469-11-01 FIG. 4

Surficial Slope Stability Evaluation

Slope Height, H (feet)	∞	
Vertical Depth of Stauration, Z (feet)	3	
Slope Inclination	2.00	:1
Slope Inclination, I (degrees)	26.6	
Unit Weight of Water, γW (pcf)	62.4	
Total Unit Weight of Soil, γ_T (pcf)	125	
Friction Angle, φ (degrees)	31	
Cohesion, C (psf)	400	
Factor of Safety = $(C+(\gamma_T-\gamma_W)Z \cos^2 i \tanh \phi)/(\gamma_T Z \sin i \cos i)$	3.27	_

References: (1) Haefeli, R. The Stability of Slopes Acted Upon by Parallel Seepage, Proc. Second International Conference,

SMFE, Rotterdam, 1948, 1, 57-62.

(2) Skempton, A. W., and F. A. Delory, Stability of Natural Slopes in London Clay, Proc. Fourth International Conference, SMFE, London, 1957, 2, 378-81.

Slope Stability Evaluation

1 3	
Slope Height, H (feet)	25
Slope Inclination	2.0 :1
Total Unit Weight of Soil, γ_T (pcf)	125
Friction Angle, φ (degrees)	31
Cohesion, C (psf)	400
$\gamma_{C\phi} = (\gamma H tan \phi)/C$	4.7
N _{Cf} (from Chart)	20
Factor of Safety = $(N_{CI}C)/(\gamma H)$	2.56

References: (1) Janbu, N. Stability Analysis of Slopes with Dimensionless Parameters, Harvard Soil Mechanics, Series No. 46, 1954.

> (2) Janbu, N. Discussion of J.M. Bell, DimensionlessParameters for Homogeneous Earth Slopes, Journal of Soil Mechanics and Foundation Design, No. SM6, November 1967.





GEOTECHNICAL CONSULTANTS 6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121 - 2974 PHONE 858 558-6900 - FAX 858 558-6159

SW/SW

SLOPE STABILITY ANALYSIS - CUT SLOPES

CALLAN ROAD REDEVELOPMENT 3030 CALLAN ROAD SAN DIEGO, CALIFORNIA

DATE 01-30-2020 PROJECT NO. G2469-11-01 FIG. 5

APPENDIX A

APPENDIX A

FIELD INVESTIGATION

We performed the drilling operations on November 21, 2019. Borings extended to maximum depth of approximately 30½ feet. The locations of the exploratory borings are shown on the Geologic Map, Figure 2 and the boring logs are presented in this Appendix. We located the borings in the field using a measuring tape and existing reference points; therefore, actual boring locations may deviate slightly. The geotechnical borings were drilled to depths ranging from approximately 10 to 30½ feet below existing grade using an Ingersoll Rand A-300 drill rig equipped with hollow-stem augers.

We obtained samples during our subsurface exploration in the borings using a California sampler. The sampler is composed of steel and are driven to obtain ring samples, and has an inside diameter of 2.5 inches and an outside diameter of 3 inches. Up to 18 rings are placed inside the sampler that is 2.4 inches in diameter and 1 inch in height. We obtained ring samples at appropriate intervals, placed them in moisture-tight containers, and transported them to the laboratory for testing. The type of sample is noted on the exploratory boring logs.

The samplers were driven 12 inches. The sampler is connected to A rods and driven into the bottom of the excavation using a 140-pound hammer with a 30-inch drop. Blow counts are recorded for every 6 inches the sampler is driven. The penetration resistances shown on the boring logs are shown in terms of blows per foot. The values indicated on the boring logs are the sum of the last 12 inches of the sampler. If the sampler was not driven for 12 inches, an approximate value is calculated in term of blows per foot or the final 6-inch interval is reported. These values are not to be taken as N-values as adjustments have not been applied. We estimated elevations shown on the boring logs either from a topographic map or by using a benchmark. Each excavation was backfilled as noted on the boring logs.

We visually examined, classified, and logged the soil encountered in the borings in general accordance with American Society for Testing and Materials (ASTM) practice for Description and Identification of Soils (Visual-Manual Procedure D 2488). The logs depict the soil and geologic conditions observed and the depth at which samples were obtained.

- 110020	1 NO. G240	00 11 0	'					
DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	BORING B 1 ELEV. (MSL.) 345' DATE COMPLETED 11-21-2019 EQUIPMENT IR A-300 BY: L. RODRIGUEZ	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
			П		MATERIAL DESCRIPTION			
- 0 -	<u> </u>	20.00			3" ASPHALT CONCRETE over 6" BASE			
L _] _{D1.1} 🔯	77.	H	CC		_		
- 2 -	B1-1			SC	PREVIOUSLY PLACED FILL (Qpf) Medium dense, moist, yellowish to grayish brown, Clayey, fine to medium SAND	_		
- 4 -				ML	SCRIPPS FORMATION (Tsc) Hard, moist, light yellowish to grayish brown, Sandy SILTSTONE	_		
- 6 -	B1-2					50/5" 		
-						_		
- 8 - 						_		
- 10 -	B1-3					50/5"	108.4	14.0
- 12 -						_		
	-					_		
- 14 -	_					_		
- 16 -	B1-4					50/5"	107.4	16.6
 - 18 -						_		
10	B1-5				-Drilling becomes more difficult	50/3"		
	B1-3				REFUSAL AT 19 FEET DUE TO CONCRETION No groundwater encountered	30/3		

Figure A-1, Log of Boring B 1, Page 1 of 1

SAMPLE SYMBOLS	SAMPLING UNSUCCESSFUL	STANDARD PENETRATION TEST	DRIVE SAMPLE (UNDISTURBED)
SAIVII LE STIVIDOLS	DISTURBED OR BAG SAMPLE	CHUNK SAMPLE	▼ WATER TABLE OR SEEPAGE

	1 NO. G240		•					
DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	BORING B 2 ELEV. (MSL.) 375' DATE COMPLETED 11-21-2019 EQUIPMENT IR A-300 BY: L. RODRIGUEZ	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
			Ħ		MATERIAL DESCRIPTION			
- 0 -		.0	+		3" ASPHALT CONCRETE over 7" BASE			
	B2-1			SM	VERY OLD PARALIC DEPOSITS (Qvop)	_		
- 2 - 					Very dense, damp, light reddish brown, Silty, fine- to medium-grained SANDSTONE	_ _		
- 4 -						_		
6 -	B2-2					50/2.5"	103.2	4.5
	1					_		
- 8 -	1				-Drilling becomes difficult	_		
-						_		
- 10 -	B2-3					- 50/3"	99.1	5.4
					BORING TERMINATED AT 10.25 FEET No groundwater encountered			

Figure A-2, Log of Boring B 2, Page 1 of 1

SAMPLE SYMBOLS	SAMPLING UNSUCCESSFUL	STANDARD PENETRATION TEST	DRIVE SAMPLE (UNDISTURBED)
OAIVII EE OTIVIBOEO	DISTURBED OR BAG SAMPLE	CHUNK SAMPLE	▼ WATER TABLE OR SEEPAGE

TROOLO	1 NO. G240	09-11-0	' 1					
DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	BORING B 3 ELEV. (MSL.) 373' DATE COMPLETED 11-21-2019 EQUIPMENT IR A-300 BY: L. RODRIGUEZ	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
			П		MATERIAL DESCRIPTION			
- 0 -		.0.0.0	,		3" ASPHALT CONCRETE over 6" BASE			
-				SC	PREVIOUSLY PLACED FILL (Qpf) Medium dense, moist, reddish brown to brown, Clayey, fine to coarse SAND; trace gravel	-		
 - 4 -						- -		
6 -	B3-1					_ 78 _	105.9	10.7
- 8 -				SM	VERY OLD PARALIC DEPOSITS (Qvop) Very dense, damp, reddish to yellowish brown, Silty, fine- to medium-grained SANDSTONE	_		
- 10 -	B3-2					_ 50/6" _	102.7	10.2
- 12 - 						- -		
- 14 <i>-</i>						_		
- 16 - 	B3-3				-Becomes light yellowish brown	50/3"	97.8	12.8
- 18 <i>-</i>						-		
- 20 - 	B3-4					50/4.5" 	97.5	11.2
- 22 - 						_ _		
- 24 - 						- - <u>-</u>		
- 26 - 	B3-5					50/4" - -	96.7	11.4
- 28 - 						- -		

Figure A-3, Log of Boring B 3, Page 1 of 2

G2469-11-01.GPJ

SAMPLE SYMBOLS

| ... SAMPLING UNSUCCESSFUL | ... STANDARD PENETRATION TEST | ... DRIVE SAMPLE (UNDISTURBED)
| ... DRIVE SAMPLE (UNDISTURBED)
| ... WATER TABLE OR SEEPAGE

PROJECT NO. G2469-11-01								
DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	BORING B 3 ELEV. (MSL.) 373' DATE COMPLETED 11-21-2019 EQUIPMENT IR A-300 BY: L. RODRIGUEZ	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
- 30 -	B3-6			SM/ML	SCRIPPS FORMATION (Tsc)	50/4.5"	98.5	13.7
					Very dense, damp, gray with orange mottling, Silty, fine-grained SANDSTONE to Sandy SILTSTONE BORING TERMINATED AT 30.5 FEET No groundwater encountered			

Figure A-3, Log of Boring B 3, Page 2 of 2

SAMPLE SYMBOLS	SAMPLING UNSUCCESSFUL	STANDARD PENETRATION TEST	DRIVE SAMPLE (UNDISTURBED)
CAIVII EE OTIVIBOEO	DISTURBED OR BAG SAMPLE	CHUNK SAMPLE	▼ WATER TABLE OR SEEPAGE

1110000	1 NO. G240	JJ-11-0	'					
DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	BORING B 4 ELEV. (MSL.) 359' DATE COMPLETED 11-21-2019 EQUIPMENT IR A-300 BY: L. RODRIGUEZ	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
			П		MATERIAL DESCRIPTION			
- 0 -		<u></u>			3" ASPHALT CONCRETE over 5" BASE			
L -	B4-1		11	CL/SC	PREVIOUSLY PLACED FILL (Qpf)	_		
- 2 -				ense	Medium dense, moist, dark brown, Sandy CLAY to Clayey, fine to coarse SAND; few organics; organic odor	_		
			1					
- 4 -	l		1					
6 -	B4-2					30	116.5	15.3
- 8 - - 8 -				SM	VERY OLD PARALIC DEPOSITS (Qvop) Very dense, dark yellowish brown to gray, Silty, fine- to medium-grained SANDSTONE	_		
40								
– 10 –	B4-3					90/11"	118.8	11.8
F -						_		
- 12 -						_		
L -						_		
- 14 -								
- 14 -								
	B4-4			ML	SCRIPPS FORMATION (Tsc)	73/11.5"	113.5	13.6
– 16 <i>–</i>]		Hard, moist, light yellowish brown, Sandy SILTSTONE	_		
			.			_		
- 18 -								
10	B4-5]			- 50/3"	111.3	13.7
	D4-3		H		BORING TERMINATED AT 19.25 FEET	- 30/3	111.5	13.7
					No groundwater encountered			
			Ιl					

Figure A-4, Log of Boring B 4, Page 1 of 1

SAMPLE SYMBOLS	SAMPLING UNSUCCESSFUL	STANDARD PENETRATION TEST	DRIVE SAMPLE (UNDISTURBED)
SAMI LE STIMBOLS	DISTURBED OR BAG SAMPLE	CHUNK SAMPLE	▼ WATER TABLE OR SEEPAGE

	1 NO. G240	30 11 0	<u> </u>					
DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	BORING B 5 ELEV. (MSL.) 365' DATE COMPLETED 11-21-2019 EQUIPMENT IR A-300 BY: L. RODRIGUEZ	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
			П		MATERIAL DESCRIPTION			
- 0 -		.v. U v U	3		3" ASPHALT CONCRETE over 5" BASE			
 - 2 -			•	SM	VERY OLD PARALIC DEPOSITS (Qvop) Very dense, damp, light reddish to yellowish brown, Silty, fine- to coarse-grained SANDSTONE; trace cobble	_		
 - 4 -			•			- -		
 - 6 -	B5-1		• • •		-Gravel/cobble layer from 5-6 feet; difficult drilling	50/3.5" 	96.8	7.6
 - 8 -			• • •			_		
 - 10 -	B5-2		• • • •	SM/ML	Very dense/hard, reddish brown to brown, Silty, fine- to medium-grained	- - - 50/5"	- 105.9	-
 - 12 -	B3-2		• • •	SIVI/IVIL	SANDSTONE to Sandy SILTSTONE	- - -	103.9	13./
 - 14 -			•			_ _		
	B5-3		•			- 50/4"	111.7	16.0
					BORING TERMINATED AT 15.5 FEET No groundwater encountered			

Figure A-5, Log of Boring B 5, Page 1 of 1

SAMPLE SYMBOLS	SAMPLING UNSUCCESSFUL	STANDARD PENETRATION TEST	DRIVE SAMPLE (UNDISTURBED)	
SAMI LE STIMBOLS	DISTURBED OR BAG SAMPLE	CHUNK SAMPLE	▼ WATER TABLE OR SEEPAGE	

APPENDIX B

APPENDIX B

LABORATORY TESTING

We performed laboratory tests in accordance with generally accepted test methods of the American Society for Testing and Materials (ASTM) or other suggested procedures. We tested selected soil samples for in-place dry density and moisture content, maximum density and optimum moisture content, direct shear strength, expansion index, water soluble sulfate, R-Value, unconfined compressive strength, and gradation characteristics. The results of our laboratory tests are presented herein. The in-place dry density and moisture content of the samples tested are presented on the boring logs in Appendix A.

TABLE B-I SUMMARY OF LABORATORY MAXIMUM DRY DENSITY AND OPTIMUM MOISTURE CONTENT TEST RESULTS ASTM D 1557

Sample No.	Description (Geologic Unit)	Maximum Dry Density (pcf)	Optimum Moisture Content (% dry wt.)
B4-1	Brown, Clayey, fine to coarse SAND to Sandy CLAY; trace gravel (Qpf)	136.9	7.8

TABLE B-II
SUMMARY OF LABORATORY DIRECT SHEAR TEST RESULTS
ASTM D 3080

	5		Dry Moisture Content (%		Content (%)	Unit Peak [Ultimate ¹]	Angle of Peak
Sample No.	Depth (feet)	Geologic Unit	Density (pcf)	Initial	Initial Final		[Ultimate ¹] Shear Resistance (degrees)
B1-4	15	Tsc	107.4	16.6	20.4	600 [400]	40 [40]
B4-2	5	Qpf	116.5	15.3	16.5	975 [975]	25 [25]
B4-3	10	Qvop	118.8	11.8	15.2	400 [350]	31 [30]

TABLE B-III
SUMMARY OF LABORATORY EXPANSION INDEX TEST RESULTS
ASTM D 4829

C1-	Moisture C	Content (%)	Dry	E	2019 CBC	ASTM Soil Expansion Classification	
Sample No.	Before Test	After Test	Density (pcf)	Expansion Index	Expansion Classification		
B2-1	8.7	13.9	115.9	5	Non-Expansive	Very Low	
B4-1	7.9	15.6	118.1	5	Non-Expansive	Very Low	

TABLE B-IV SUMMARY OF LABORATORY WATER-SOLUBLE SULFATE TEST RESULTS CALIFORNIA TEST NO. 417

Sample No.	Depth (feet)	Geologic Unit	Water-Soluble Sulfate (%)	ACI 318 Sulfate Exposure
B2-1	1 – 5	Qvop	0.014	S0
B4-1	1 – 5	Qpf	0.011	S0

TABLE B-V SUMMARY OF LABORATORY RESISTANCE VALUE (R-VALUE) TEST RESULTS ASTM D 2844

Sample No.	Depth (feet)	Description (Geologic Unit)	R-Value
B4-1	0-5	Brown, Clayey, fine to coarse SAND to Sandy CLAY; trace gravel (Qudf)	7

TABLE B-VI SUMMARY OF LABORATORY UNCONFINED COMPRESSIVE STRENGTH TEST RESULTS ASTM D 1558

Sample No.	Depth (feet)	Geologic Unit	Hand Penetrometer Reading/Unconfined Compression Strength (tsf) and Undrained Shear Strength (ksf)
B1-3	10	Tsc	4.5
B2-2	5	Qvop	3.5
B2-3	10	Qvop	4.5
B3-1	5	Qpf	4.5
B3-2	10	Qvop	4.5
B3-3	15	Qvop	4.5
B4-4	15	Qvop	4.5
B4-5	19	Qvop	4.5
B5-2	10	Qvop	4.5
B5-3	15	Qvop	4.5

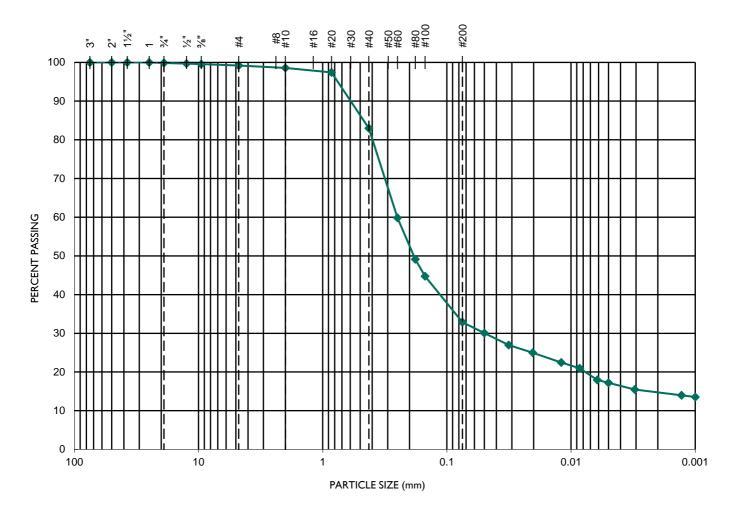
SAMPLE NO.: B4-I
SAMPLE DEPTH (FT.): 0-5'

GEOLOGIC UNIT: Qudf

GRA	VEL	SAND			
COARSE	FINE	COARSE	MEDIUM	FINE	

SILT OR CLAY

U.S. STANDARD SIEVE SIZE



TEST DATA							
D ₁₀ (mm)	D ₃₀ (mm)	D ₆₀ (mm)	C _c	C _u	SOIL DESCRIPTION		
	0.0495357	0.2512417			Silty Clayey SAND		

GEOCON INCORPORATED



GEOTECHNICAL CONSULTANTS 6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121 - 2974 PHONE 858 558-6900 - FAX 858 558-6159 SIEVE ANALYSES - ASTM D 135 & D 422

CALLAN ROAD REDEVELOPMENT

PROJECT NO.: G2469-11-01

APPENDIX C

APPENDIX C RECOMMENDED GRADING SPECIFICATIONS

FOR

CALLAN ROAD REDEVELOPMENT 3030 CALLAN ROAD SAN DIEGO, CALIFORNIA

PROJECT NO. G2469-11-01

RECOMMENDED GRADING SPECIFICATIONS

1. GENERAL

- 1.1 These Recommended Grading Specifications shall be used in conjunction with the Geotechnical Report for the project prepared by Geocon. The recommendations contained in the text of the Geotechnical Report are a part of the earthwork and grading specifications and shall supersede the provisions contained hereinafter in the case of conflict.
- 1.2 Prior to the commencement of grading, a geotechnical consultant (Consultant) shall be employed for the purpose of observing earthwork procedures and testing the fills for substantial conformance with the recommendations of the Geotechnical Report and these specifications. The Consultant should provide adequate testing and observation services so that they may assess whether, in their opinion, the work was performed in substantial conformance with these specifications. It shall be the responsibility of the Contractor to assist the Consultant and keep them apprised of work schedules and changes so that personnel may be scheduled accordingly.
- 1.3 It shall be the sole responsibility of the Contractor to provide adequate equipment and methods to accomplish the work in accordance with applicable grading codes or agency ordinances, these specifications and the approved grading plans. If, in the opinion of the Consultant, unsatisfactory conditions such as questionable soil materials, poor moisture condition, inadequate compaction, and/or adverse weather result in a quality of work not in conformance with these specifications, the Consultant will be empowered to reject the work and recommend to the Owner that grading be stopped until the unacceptable conditions are corrected.

2. **DEFINITIONS**

- 2.1 **Owner** shall refer to the owner of the property or the entity on whose behalf the grading work is being performed and who has contracted with the Contractor to have grading performed.
- 2.2 **Contractor** shall refer to the Contractor performing the site grading work.
- 2.3 Civil Engineer or Engineer of Work shall refer to the California licensed Civil Engineer or consulting firm responsible for preparation of the grading plans, surveying and verifying as-graded topography.
- 2.4 **Consultant** shall refer to the soil engineering and engineering geology consulting firm retained to provide geotechnical services for the project.

- 2.5 **Soil Engineer** shall refer to a California licensed Civil Engineer retained by the Owner, who is experienced in the practice of geotechnical engineering. The Soil Engineer shall be responsible for having qualified representatives on-site to observe and test the Contractor's work for conformance with these specifications.
- 2.6 **Engineering Geologist** shall refer to a California licensed Engineering Geologist retained by the Owner to provide geologic observations and recommendations during the site grading.
- 2.7 **Geotechnical Report** shall refer to a soil report (including all addenda) which may include a geologic reconnaissance or geologic investigation that was prepared specifically for the development of the project for which these Recommended Grading Specifications are intended to apply.

3. MATERIALS

- 3.1 Materials for compacted fill shall consist of any soil excavated from the cut areas or imported to the site that, in the opinion of the Consultant, is suitable for use in construction of fills. In general, fill materials can be classified as *soil* fills, *soil-rock* fills or *rock* fills, as defined below.
 - 3.1.1 **Soil fills** are defined as fills containing no rocks or hard lumps greater than 12 inches in maximum dimension and containing at least 40 percent by weight of material smaller than 34 inch in size.
 - 3.1.2 **Soil-rock fills** are defined as fills containing no rocks or hard lumps larger than 4 feet in maximum dimension and containing a sufficient matrix of soil fill to allow for proper compaction of soil fill around the rock fragments or hard lumps as specified in Paragraph 6.2. **Oversize rock** is defined as material greater than 12 inches.
 - 3.1.3 **Rock fills** are defined as fills containing no rocks or hard lumps larger than 3 feet in maximum dimension and containing little or no fines. Fines are defined as material smaller than 3/4 inch in maximum dimension. The quantity of fines shall be less than approximately 20 percent of the rock fill quantity.
- 3.2 Material of a perishable, spongy, or otherwise unsuitable nature as determined by the Consultant shall not be used in fills.
- 3.3 Materials used for fill, either imported or on-site, shall not contain hazardous materials as defined by the California Code of Regulations, Title 22, Division 4, Chapter 30, Articles 9

and 10; 40CFR; and any other applicable local, state or federal laws. The Consultant shall not be responsible for the identification or analysis of the potential presence of hazardous materials. However, if observations, odors or soil discoloration cause Consultant to suspect the presence of hazardous materials, the Consultant may request from the Owner the termination of grading operations within the affected area. Prior to resuming grading operations, the Owner shall provide a written report to the Consultant indicating that the suspected materials are not hazardous as defined by applicable laws and regulations.

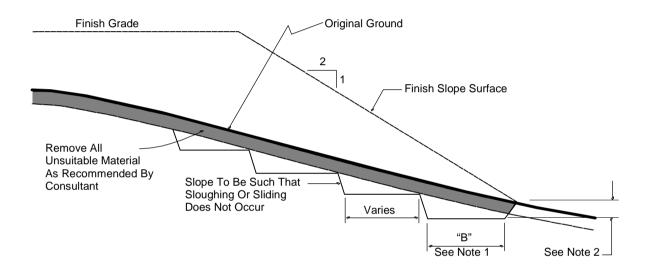
- 3.4 The outer 15 feet of *soil-rock* fill slopes, measured horizontally, should be composed of properly compacted *soil* fill materials approved by the Consultant. *Rock* fill may extend to the slope face, provided that the slope is not steeper than 2:1 (horizontal:vertical) and a soil layer no thicker than 12 inches is track-walked onto the face for landscaping purposes. This procedure may be utilized provided it is acceptable to the governing agency, Owner and Consultant.
- 3.5 Samples of soil materials to be used for fill should be tested in the laboratory by the Consultant to determine the maximum density, optimum moisture content, and, where appropriate, shear strength, expansion, and gradation characteristics of the soil.
- 3.6 During grading, soil or groundwater conditions other than those identified in the Geotechnical Report may be encountered by the Contractor. The Consultant shall be notified immediately to evaluate the significance of the unanticipated condition.

4. CLEARING AND PREPARING AREAS TO BE FILLED

- 4.1 Areas to be excavated and filled shall be cleared and grubbed. Clearing shall consist of complete removal above the ground surface of trees, stumps, brush, vegetation, man-made structures, and similar debris. Grubbing shall consist of removal of stumps, roots, buried logs and other unsuitable material and shall be performed in areas to be graded. Roots and other projections exceeding 1½ inches in diameter shall be removed to a depth of 3 feet below the surface of the ground. Borrow areas shall be grubbed to the extent necessary to provide suitable fill materials.
- 4.2 Asphalt pavement material removed during clearing operations should be properly disposed at an approved off-site facility or in an acceptable area of the project evaluated by Geocon and the property owner. Concrete fragments that are free of reinforcing steel may be placed in fills, provided they are placed in accordance with Section 6.2 or 6.3 of this document.

- 4.3 After clearing and grubbing of organic matter and other unsuitable material, loose or porous soils shall be removed to the depth recommended in the Geotechnical Report. The depth of removal and compaction should be observed and approved by a representative of the Consultant. The exposed surface shall then be plowed or scarified to a minimum depth of 6 inches and until the surface is free from uneven features that would tend to prevent uniform compaction by the equipment to be used.
- 4.4 Where the slope ratio of the original ground is steeper than 5:1 (horizontal:vertical), or where recommended by the Consultant, the original ground should be benched in accordance with the following illustration.

TYPICAL BENCHING DETAIL



No Scale

DETAIL NOTES:

- (1) Key width "B" should be a minimum of 10 feet, or sufficiently wide to permit complete coverage with the compaction equipment used. The base of the key should be graded horizontal, or inclined slightly into the natural slope.
- (2) The outside of the key should be below the topsoil or unsuitable surficial material and at least 2 feet into dense formational material. Where hard rock is exposed in the bottom of the key, the depth and configuration of the key may be modified as approved by the Consultant.
- 4.5 After areas to receive fill have been cleared and scarified, the surface should be moisture conditioned to achieve the proper moisture content, and compacted as recommended in Section 6 of these specifications.

5. COMPACTION EQUIPMENT

- 5.1 Compaction of *soil* or *soil-rock* fill shall be accomplished by sheepsfoot or segmented-steel wheeled rollers, vibratory rollers, multiple-wheel pneumatic-tired rollers, or other types of acceptable compaction equipment. Equipment shall be of such a design that it will be capable of compacting the *soil* or *soil-rock* fill to the specified relative compaction at the specified moisture content.
- 5.2 Compaction of *rock* fills shall be performed in accordance with Section 6.3.

6. PLACING, SPREADING AND COMPACTION OF FILL MATERIAL

- 6.1 *Soil* fill, as defined in Paragraph 3.1.1, shall be placed by the Contractor in accordance with the following recommendations:
 - 6.1.1 Soil fill shall be placed by the Contractor in layers that, when compacted, should generally not exceed 8 inches. Each layer shall be spread evenly and shall be thoroughly mixed during spreading to obtain uniformity of material and moisture in each layer. The entire fill shall be constructed as a unit in nearly level lifts. Rock materials greater than 12 inches in maximum dimension shall be placed in accordance with Section 6.2 or 6.3 of these specifications.
 - 6.1.2 In general, the *soil* fill shall be compacted at a moisture content at or above the optimum moisture content as determined by ASTM D 1557.
 - 6.1.3 When the moisture content of *soil* fill is below that specified by the Consultant, water shall be added by the Contractor until the moisture content is in the range specified.
 - 6.1.4 When the moisture content of the *soil* fill is above the range specified by the Consultant or too wet to achieve proper compaction, the *soil* fill shall be aerated by the Contractor by blading/mixing, or other satisfactory methods until the moisture content is within the range specified.
 - 6.1.5 After each layer has been placed, mixed, and spread evenly, it shall be thoroughly compacted by the Contractor to a relative compaction of at least 90 percent. Relative compaction is defined as the ratio (expressed in percent) of the in-place dry density of the compacted fill to the maximum laboratory dry density as determined in accordance with ASTM D 1557. Compaction shall be continuous over the entire area, and compaction equipment shall make sufficient passes so that the specified minimum relative compaction has been achieved throughout the entire fill.

- 6.1.6 Where practical, soils having an Expansion Index greater than 50 should be placed at least 3 feet below finish pad grade and should be compacted at a moisture content generally 2 to 4 percent greater than the optimum moisture content for the material.
- 6.1.7 Properly compacted *soil* fill shall extend to the design surface of fill slopes. To achieve proper compaction, it is recommended that fill slopes be over-built by at least 3 feet and then cut to the design grade. This procedure is considered preferable to track-walking of slopes, as described in the following paragraph.
- 6.1.8 As an alternative to over-building of slopes, slope faces may be back-rolled with a heavy-duty loaded sheepsfoot or vibratory roller at maximum 4-foot fill height intervals. Upon completion, slopes should then be track-walked with a D-8 dozer or similar equipment, such that a dozer track covers all slope surfaces at least twice.
- 6.2 *Soil-rock* fill, as defined in Paragraph 3.1.2, shall be placed by the Contractor in accordance with the following recommendations:
 - 6.2.1 Rocks larger than 12 inches but less than 4 feet in maximum dimension may be incorporated into the compacted *soil* fill, but shall be limited to the area measured 15 feet minimum horizontally from the slope face and 5 feet below finish grade or 3 feet below the deepest utility, whichever is deeper.
 - 6.2.2 Rocks or rock fragments up to 4 feet in maximum dimension may either be individually placed or placed in windrows. Under certain conditions, rocks or rock fragments up to 10 feet in maximum dimension may be placed using similar methods. The acceptability of placing rock materials greater than 4 feet in maximum dimension shall be evaluated during grading as specific cases arise and shall be approved by the Consultant prior to placement.
 - 6.2.3 For individual placement, sufficient space shall be provided between rocks to allow for passage of compaction equipment.
 - 6.2.4 For windrow placement, the rocks should be placed in trenches excavated in properly compacted *soil* fill. Trenches should be approximately 5 feet wide and 4 feet deep in maximum dimension. The voids around and beneath rocks should be filled with approved granular soil having a Sand Equivalent of 30 or greater and should be compacted by flooding. Windrows may also be placed utilizing an "open-face" method in lieu of the trench procedure, however, this method should first be approved by the Consultant.

- 6.2.5 Windrows should generally be parallel to each other and may be placed either parallel to or perpendicular to the face of the slope depending on the site geometry. The minimum horizontal spacing for windrows shall be 12 feet center-to-center with a 5-foot stagger or offset from lower courses to next overlying course. The minimum vertical spacing between windrow courses shall be 2 feet from the top of a lower windrow to the bottom of the next higher windrow.
- 6.2.6 Rock placement, fill placement and flooding of approved granular soil in the windrows should be continuously observed by the Consultant.
- 6.3 *Rock* fills, as defined in Section 3.1.3, shall be placed by the Contractor in accordance with the following recommendations:
 - 6.3.1 The base of the *rock* fill shall be placed on a sloping surface (minimum slope of 2 percent). The surface shall slope toward suitable subdrainage outlet facilities. The *rock* fills shall be provided with subdrains during construction so that a hydrostatic pressure buildup does not develop. The subdrains shall be permanently connected to controlled drainage facilities to control post-construction infiltration of water.
 - 6.3.2 Rock fills shall be placed in lifts not exceeding 3 feet. Placement shall be by rock trucks traversing previously placed lifts and dumping at the edge of the currently placed lift. Spreading of the rock fill shall be by dozer to facilitate seating of the rock. The rock fill shall be watered heavily during placement. Watering shall consist of water trucks traversing in front of the current rock lift face and spraying water continuously during rock placement. Compaction equipment with compactive energy comparable to or greater than that of a 20-ton steel vibratory roller or other compaction equipment providing suitable energy to achieve the required compaction or deflection as recommended in Paragraph 6.3.3 shall be utilized. The number of passes to be made should be determined as described in Paragraph 6.3.3. Once a rock fill lift has been covered with soil fill, no additional rock fill lifts will be permitted over the soil fill.
 - 6.3.3 Plate bearing tests, in accordance with ASTM D 1196, may be performed in both the compacted *soil* fill and in the *rock* fill to aid in determining the required minimum number of passes of the compaction equipment. If performed, a minimum of three plate bearing tests should be performed in the properly compacted *soil* fill (minimum relative compaction of 90 percent). Plate bearing tests shall then be performed on areas of *rock* fill having two passes, four passes and six passes of the compaction equipment, respectively. The number of passes required for the *rock* fill shall be determined by comparing the results of the plate bearing tests for the *soil* fill and the *rock* fill and by evaluating the deflection

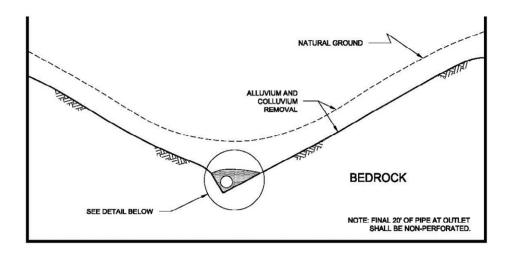
variation with number of passes. The required number of passes of the compaction equipment will be performed as necessary until the plate bearing deflections are equal to or less than that determined for the properly compacted *soil* fill. In no case will the required number of passes be less than two.

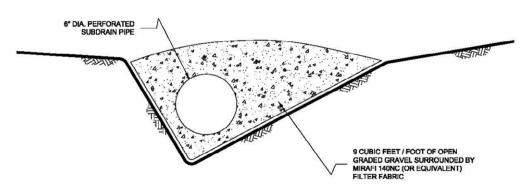
- 6.3.4 A representative of the Consultant should be present during *rock* fill operations to observe that the minimum number of "passes" have been obtained, that water is being properly applied and that specified procedures are being followed. The actual number of plate bearing tests will be determined by the Consultant during grading.
- 6.3.5 Test pits shall be excavated by the Contractor so that the Consultant can state that, in their opinion, sufficient water is present and that voids between large rocks are properly filled with smaller rock material. In-place density testing will not be required in the *rock* fills.
- 6.3.6 To reduce the potential for "piping" of fines into the *rock* fill from overlying *soil* fill material, a 2-foot layer of graded filter material shall be placed above the uppermost lift of *rock* fill. The need to place graded filter material below the *rock* should be determined by the Consultant prior to commencing grading. The gradation of the graded filter material will be determined at the time the *rock* fill is being excavated. Materials typical of the *rock* fill should be submitted to the Consultant in a timely manner, to allow design of the graded filter prior to the commencement of *rock* fill placement.
- 6.3.7 *Rock* fill placement should be continuously observed during placement by the Consultant.

7. SUBDRAINS

7.1 The geologic units on the site may have permeability characteristics and/or fracture systems that could be susceptible under certain conditions to seepage. The use of canyon subdrains may be necessary to mitigate the potential for adverse impacts associated with seepage conditions. Canyon subdrains with lengths in excess of 500 feet or extensions of existing offsite subdrains should use 8-inch-diameter pipes. Canyon subdrains less than 500 feet in length should use 6-inch-diameter pipes.

TYPICAL CANYON DRAIN DETAIL





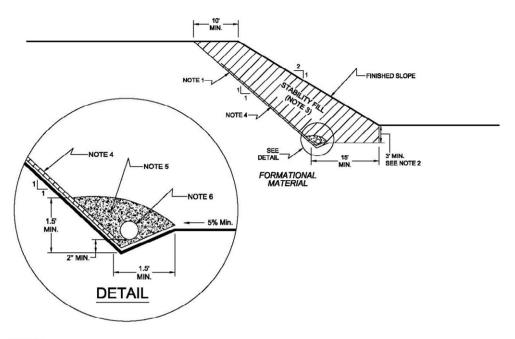
NOTES:

- 1......8-INCH DIAMETER, SCHEDULE 80 PVC PERFORATED PIPE FOR FILLS IN EXCESS OF 100-FEET IN DEPTH OR A PIPE LENGTH OF LONGER THAN 500 FEET.
- 2.....6-INCH DIAMETER, SCHEDULE 40 PVC PERFORATED PIPE FOR FILLS LESS THAN 100-FEET IN DEPTH OR A PIPE LENGTH SHORTER THAN 500 FEET.

NO SCALE

7.2 Slope drains within stability fill keyways should use 4-inch-diameter (or lager) pipes.

TYPICAL STABILITY FILL DETAIL



NOTES:

- 1.....EXCAVATE BACKCUT AT 1:1 INCLINATION (UNLESS OTHERWISE NOTED).
- 2.....BASE OF STABILITY FILL TO BE 3 FEET INTO FORMATIONAL MATERIAL, SLOPING A MINIMUM 5% INTO SLOPE.
- 3.....STABILITY FILL TO BE COMPOSED OF PROPERLY COMPACTED GRANULAR SOIL.
- 4.....CHIMNEY DRAINS TO BE APPROVED PREFABRICATED CHIMNEY DRAIN PANELS (MIRADRAIN G200N OR EQUIVALENT)
 SPACED APPROXIMATELY 20 FEET CENTER TO CENTER AND 4 FEET WIDE. CLOSER SPACING MAY BE REQUIRED IF
 SEEPAGE IS ENCOUNTERED.
- 5.....FILTER MATERIAL TO BE 3/4-INCH, OPEN-GRADED CRUSHED ROCK ENCLOSED IN APPROVED FILTER FABRIC (MIRAFI 140NC).
- 8.....COLLECTOR PIPE TO BE 4-INCH MINIMUM DIAMETER, PERFORATED, THICK-WALLED PVC SCHEDULE 40 OR EQUIVALENT, AND SLOPED TO DRAIN AT 1 PERCENT MINIMUM TO APPROVED OUTLET.

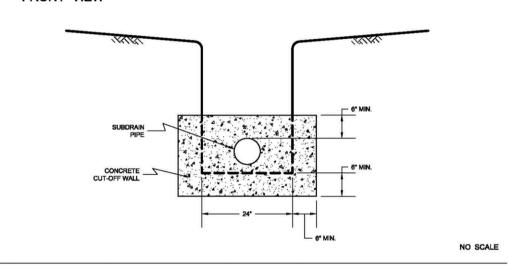
NO SCALE

- 7.3 The actual subdrain locations will be evaluated in the field during the remedial grading operations. Additional drains may be necessary depending on the conditions observed and the requirements of the local regulatory agencies. Appropriate subdrain outlets should be evaluated prior to finalizing 40-scale grading plans.
- 7.4 *Rock* fill or *soil-rock* fill areas may require subdrains along their down-slope perimeters to mitigate the potential for buildup of water from construction or landscape irrigation. The subdrains should be at least 6-inch-diameter pipes encapsulated in gravel and filter fabric. *Rock* fill drains should be constructed using the same requirements as canyon subdrains.

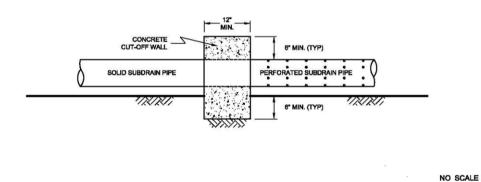
7.5 Prior to outletting, the final 20-foot segment of a subdrain that will not be extended during future development should consist of non-perforated drainpipe. At the non-perforated/perforated interface, a seepage cutoff wall should be constructed on the downslope side of the pipe.

TYPICAL CUT OFF WALL DETAIL



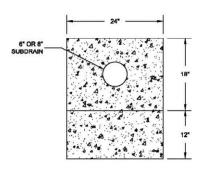


SIDE VIEW

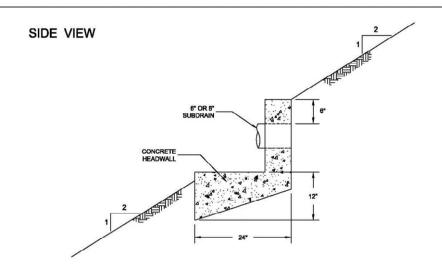


7.6 Subdrains that discharge into a natural drainage course or open space area should be provided with a permanent headwall structure.

FRONT VIEW



NO SCALE



NOTE: HEADWALL SHOULD OUTLET AT TOE OF FILL SLOPE OR INTO CONTROLLED SURFACE DRAINAGE

NO SCALE

7.7 The final grading plans should show the location of the proposed subdrains. After completion of remedial excavations and subdrain installation, the project civil engineer should survey the drain locations and prepare an "as-built" map showing the drain locations. The final outlet and connection locations should be determined during grading operations. Subdrains that will be extended on adjacent projects after grading can be placed on formational material and a vertical riser should be placed at the end of the subdrain. The grading contractor should consider videoing the subdrains shortly after burial to check proper installation and functionality. The contractor is responsible for the performance of the drains.

8. OBSERVATION AND TESTING

- 8.1 The Consultant shall be the Owner's representative to observe and perform tests during clearing, grubbing, filling, and compaction operations. In general, no more than 2 feet in vertical elevation of *soil* or *soil-rock* fill should be placed without at least one field density test being performed within that interval. In addition, a minimum of one field density test should be performed for every 2,000 cubic yards of *soil* or *soil-rock* fill placed and compacted.
- 8.2 The Consultant should perform a sufficient distribution of field density tests of the compacted *soil* or *soil-rock* fill to provide a basis for expressing an opinion whether the fill material is compacted as specified. Density tests shall be performed in the compacted materials below any disturbed surface. When these tests indicate that the density of any layer of fill or portion thereof is below that specified, the particular layer or areas represented by the test shall be reworked until the specified density has been achieved.
- 8.3 During placement of *rock* fill, the Consultant should observe that the minimum number of passes have been obtained per the criteria discussed in Section 6.3.3. The Consultant should request the excavation of observation pits and may perform plate bearing tests on the placed *rock* fills. The observation pits will be excavated to provide a basis for expressing an opinion as to whether the *rock* fill is properly seated and sufficient moisture has been applied to the material. When observations indicate that a layer of *rock* fill or any portion thereof is below that specified, the affected layer or area shall be reworked until the *rock* fill has been adequately seated and sufficient moisture applied.
- A settlement monitoring program designed by the Consultant may be conducted in areas of *rock* fill placement. The specific design of the monitoring program shall be as recommended in the Conclusions and Recommendations section of the project Geotechnical Report or in the final report of testing and observation services performed during grading.
- 8.5 We should observe the placement of subdrains, to check that the drainage devices have been placed and constructed in substantial conformance with project specifications.
- 8.6 Testing procedures shall conform to the following Standards as appropriate:

8.6.1 Soil and Soil-Rock Fills:

8.6.1.1 Field Density Test, ASTM D 1556, Density of Soil In-Place By the Sand-Cone Method.

- 8.6.1.2 Field Density Test, Nuclear Method, ASTM D 6938, Density of Soil and Soil-Aggregate In-Place by Nuclear Methods (Shallow Depth).
- 8.6.1.3 Laboratory Compaction Test, ASTM D 1557, Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10-Pound Hammer and 18-Inch Drop.
- 8.6.1.4. Expansion Index Test, ASTM D 4829, Expansion Index Test.

9. PROTECTION OF WORK

- 9.1 During construction, the Contractor shall properly grade all excavated surfaces to provide positive drainage and prevent ponding of water. Drainage of surface water shall be controlled to avoid damage to adjoining properties or to finished work on the site. The Contractor shall take remedial measures to prevent erosion of freshly graded areas until such time as permanent drainage and erosion control features have been installed. Areas subjected to erosion or sedimentation shall be properly prepared in accordance with the Specifications prior to placing additional fill or structures.
- 9.2 After completion of grading as observed and tested by the Consultant, no further excavation or filling shall be conducted except in conjunction with the services of the Consultant.

10. CERTIFICATIONS AND FINAL REPORTS

- 10.1 Upon completion of the work, Contractor shall furnish Owner a certification by the Civil Engineer stating that the lots and/or building pads are graded to within 0.1 foot vertically of elevations shown on the grading plan and that all tops and toes of slopes are within 0.5 foot horizontally of the positions shown on the grading plans. After installation of a section of subdrain, the project Civil Engineer should survey its location and prepare an *as-built* plan of the subdrain location. The project Civil Engineer should verify the proper outlet for the subdrains and the Contractor should ensure that the drain system is free of obstructions.
- The Owner is responsible for furnishing a final as-graded soil and geologic report satisfactory to the appropriate governing or accepting agencies. The as-graded report should be prepared and signed by a California licensed Civil Engineer experienced in geotechnical engineering and by a California Certified Engineering Geologist, indicating that the geotechnical aspects of the grading were performed in substantial conformance with the Specifications or approved changes to the Specifications.

LIST OF REFERENCES

- 1. 2019 California Building Code, California Code of Regulations, Title 24, Part 2, based on the 2018 International Building Code, prepared by California Building Standards Commission, dated July 2019.
- 2. American Concrete Institute, ACI 318-11, Building Code Requirements for Structural Concrete and Commentary, dated August, 2011.
- 3. American Concrete Institute, ACI 330-08, Guide for the Design and Construction of Concrete Parking Lots, dated June, 2008.
- 4. American Society of Civil Engineers (ASCE) 7-16, Minimum Design Loads and Associated Criteria for Buildings and Other Structures, 2017.
- 5. Boore, D. M., and G. M Atkinson (2006), Ground Motion Prediction Equations for the Average Horizontal Component of PGA, PVG, and 5%-Ramped PSA at Spectral Periods Between 0.01s and 10.0s, Earthquake Spectra, Vol. 24, Issue I, February 2008.
- 6. California Department of Conservation, Division of Mines and Geology, *Probabilistic Seismic Hazard Assessment for the State of California*, Open File Report 96-08, 1996.
- 7. California Geological Survey, *Seismic Shaking Hazards in California*, Based on the USGS/CGS Probabilistic Seismic Hazards Assessment (PSHA) Model, 2002 (revised April 2003). 10% probability of being exceeded in 50 years.

 http://redirect.conservation.ca.gov/cgs/rghm/pshamap/pshamain.html
- 8. Campbell, K. W., Y. Bozorgnia, NGA Ground Motion Model for the Geometric Mean Horizontal Component of PGA, PGV, PGD and 5% Damped Linear Elastic Response Spectra for Periods Ranging from 0.01 to 10 s, Preprint of version submitted for publication in the NGA Special Volume of Earthquake Spectra, Volume 24, Issue 1, pages 139-171, February 2008.
- 9. Chiou, Brian, and Robert R. Youngs, *A NGA Model for the Average Horizontal Component of Peak Ground Motion and Response Spectra*, preprint for article to be published <u>in NGA Special Edition for Earthquake Spectra</u>, Spring 2008.
- 10. City of San Diego Seismic Safety Study, Geologic Hazards and Faults, 2008 edition, Map Sheet 34.
- 11. County of San Diego, San Diego County Multi Jurisdiction Hazard Mitigation Plan, San Diego, California Final Draft, dated July, 2010.
- 12. Historical Aerial Photos. http://www.historicaerials.com
- 13. Kennedy, M. P. and S. S. Tan, 2008, *Geologic Map of the San Diego 30'x60' Quadrangle, California*, USGS Regional Map Series Map No. 3, Scale 1:100,000.
- 14. Risk Engineering, EZ-FRISK, 2016.
- 15. SEAOC web application, OSHPD Seismic Design Maps, https://seismicmaps.org/.

LIST OF REFERENCES (Concluded)

- 16. Special Publication 117A, *Guidelines For Evaluating and Mitigating Seismic Hazards in California 2008*, California Geological Survey, Revised and Re-adopted September 11, 2008.
- 17. Unpublished reports, aerial photographs, and maps on file with Geocon Incorporated.
- 18. USGS computer program, Seismic Hazard Curves and Uniform Hazard Response Spectra, http://geohazards.usgs.gov/designmaps/us/application.php.

STORM WATER MANAGEMENT INVESTIGATION

CALLAN ROAD REDEVELOPMENT 3030 CALLAN ROAD SAN DIEGO, CALIFORNIA



GEOTECHNICAL ENVIRONMENTAL MATERIALS

PREPARED FOR

PROJECT MANAGEMENT ADVISORS, LLC SOLANA BEACH, CALIFORNIA

JANUARY 30, 2020 PROJECT NO. G2469-11-01



GEOTECHNICAL **E** ENVIRONMENTAL **E** MATERIALS



Project No. G2469-11-01 January 30, 2020

Project Management Advisors, Inc. 420 Stevens Avenue, Suite 170 Solana Beach, California 92075

Attention: Ms. Crista Swan

Subject: STORM WATER MANAGEMENT INVESTIGATION

CALLAN ROAD REDEVELOPMENT

3030 CALLAN ROAD SAN DIEGO, CALIFORNIA

Reference: Geotechnical Investigation, Callan Road Redevelopment, 3030 Callan Road, San

Diego, California, prepared by Geocon Incorporated, draft dated December 13, 2019

(Project No. G2469-11-01).

Dear Ms. Swan:

In accordance with your request and authorization of our Proposal No. LG-19437 dated November 6, 2019, we herein submit the results of our storm water management investigation for the property located at 3030 Callan Road in the City of San Diego, California (see Figure 1, Vicinity Map).

SITE AND PROJECT DESCRIPTION

The irregularly-shaped, approximately 2.65-acre property currently consists of two occupied office buildings, asphalt parking and driveways, concrete flatwork, landscaping and associated improvements. The site is located on the north side of Callan Road within the Torrey Pines Business Park and is bordered by office buildings to north, west and south, and undeveloped descending hillside to the east and south. Access to the property extends from Callan Road along an approximately 400-foot driveway to the parking lot. Ascending landscaped slopes extending to neighboring properties exist along the north and west perimeters of the site, and slopes exist between three tiers of on-grade asphalt parking levels. The existing elevations range from approximately 350 to 400 feet Mean Sea Level (MSL) at the northeast corner of the site and the entrance at Callan Road, respectively.

We prepared the referenced geotechnical investigation report for the site and proposed development. Our field investigation consisted of advancing 5 exploratory borings (Borings B-1 through B-5) to a maximum depth of about 30½ feet and performing 2 infiltration tests. During our investigation, we encountered one surficial soil unit (consisting of previously placed fill) and two formational units

(consisting of Very Old Paralic Deposits and the Scripps Formation). We encountered previously placed fill in our Borings B-1, B-3 and B-4 to depths ranging from about 3 to 7 feet overlying the Very Old Paralic Deposits and/or the Scripps Formation. The occurrence, distribution, and description of each unit encountered are shown on the Geologic Map, Figure 2 and on the boring logs in Appendix A of the referenced report.

STORM WATER MANAGEMENT INVESTIGATION

We understand storm water management devices are being proposed in accordance with the 2018 City of San Diego Storm Water Standards (SWS). If not properly constructed, there is a potential for distress to improvements and properties located hydrologically down gradient or adjacent to these devices. Factors such as the amount of water to be detained, its residence time, and soil permeability have an important effect on seepage transmission and the potential adverse impacts that may occur if the storm water management features are not properly designed and constructed. We have not performed a hydrogeological study at the site. If infiltration of storm water runoff occurs, downstream properties may be subjected to seeps, springs, slope instability, raised groundwater, movement of foundations and slabs, or other undesirable impacts as a result of water infiltration.

Hydrologic Soil Group

The United States Department of Agriculture (USDA), Natural Resources Conservation Services, possesses general information regarding the existing soil conditions for areas within the United States. The USDA website also provides the Hydrologic Soil Group. Table 1 presents the descriptions of the hydrologic soil groups. If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. In addition, the USDA website also provides an estimated saturated hydraulic conductivity for the existing soil.

TABLE 1
HYDROLOGIC SOIL GROUP DEFINITIONS

Soil Group	Soil Group Definition
A	Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.
В	Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.
С	Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.
D	Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

The property is underlain by man-made previously placed fill and should be classified as Soil Group D. The Hydrologic Soil Group Map presents output from the USDA website showing the limits of the soil units.



Hydrologic Soil Group Map

Table 2 presents the information from the USDA website for the subject property.

TABLE 2
USDA WEB SOIL SURVEY – HYDROLOGIC SOIL GROUP*

Map Unit Name	Map Unit Symbol	Approximate Percentage of Property	Hydrologic Soil Group	k _{SAT} of Most Limiting Layer (Inches/ Hour)
Carlsbad gravelly loamy sand	CbD	93	В	1.98 – 5.95
Terrace Escarpments	TeF	7	Info. Not Available	Info. Not Available

^{*}The areas of the property that possess fill materials should be considered to possess a Hydrologic Soil Group D.

In Situ Testing

We performed 2 constant-head infiltration tests using the Aardvark permeameter at the locations shown on the Geologic Map, Figure 2. Table 3 presents the results of the infiltration tests. The field data sheets are attached herein. We applied a feasibility factor of safety of 2.0 to our estimated infiltration rates to provide input on Worksheet C.4-1. Soil infiltration rates from in-situ tests can vary significantly from one location to another due to the heterogeneous characteristics inherent to most soil.

TABLE 3
INFILTRATION TEST RESULTS

Test No.	Geologic Unit	Test Elevation (feet, MSL)	Field-Saturated Hydraulic Conductivity/Infiltration Rate, k _{sat} (inch/hour)	Worksheet Infiltration Rate ¹ (inch/hour)
I-1	Tsc	345	0.0001	0.0001
I-2	Qvop	338	0.078	0.039
	Average		0.039	0.020

¹Using a Factor of Safety of 2.

Infiltration categories include full infiltration, partial infiltration and no infiltration. Table 4 presents the commonly accepted definitions of the potential infiltration categories based on the infiltration rates.

TABLE 4
INFILTRATION CATEGORIES

Infiltration Category	Field Infiltration Rate, I (Inches/Hour)	Factored Infiltration Rate ¹ , I (Inches/Hour)
Full Infiltration	I > 1.0	I > 0.5
Partial Infiltration	$0.10 < I \le 1.0$	$0.05 < I \le 0.5$
No Infiltration (Infeasible)	I < 0.10	I < 0.05

¹Using a Factor of Safety of 2.

Based on our observations and test results, the factored infiltration rates for the formational materials onsite (Very Old Paralic Deposits and Scripps Formation) is less than 0.05 inches per hour. Therefore, full and partial infiltration on the property is considered infeasible based on the calculated infiltrations rates. Vertical cutoff walls or liners should be installed on the sides and bottom of planned infiltration basins and a drain should be installed at the base of the basins.

GEOTECHNICAL CONSIDERATIONS

Groundwater Elevations

We did not encounter groundwater or seepage during our site investigation, and we expect a static groundwater elevation exists greater than 50 feet below existing grades.

New or Existing Utilities

Utilities are located on and adjacent to the property within the existing parking area, driveways, and roadways. Therefore, full and partial infiltration within the areas near these utilities should be considered infeasible. Setbacks for infiltration should be incorporated. The setback for infiltration devices should be a minimum of 10 feet and a 1:1 plane of 1 foot below the closest edge of the deepest adjacent utility.

Slope Hazards

An existing, natural descending slope exists to the east of the site. In addition, fill slopes exist on the site between three tiers of on-grade asphalt parking levels. If infiltration is allowed adjacent to the existing slopes at the site, water migration and the resulting seepage forces can negatively affect the stability of the slopes and cause erosion. The existing fill and formational materials possess limited vertical infiltration characteristics and water allowed to infiltrate on the site would migrate laterally to adjacent improvements. Infiltration devices should not be installed adjacent to slopes unless they are lined, possess a minimum setback distance of 50 feet or 1.5 times the slope height (whichever results in a larger setback), or extend below the height of the slope.

Soil or Groundwater Contamination

We are unaware of contaminated soil on the property. Therefore, infiltration associated with this risk is considered feasible.

CONCLUSIONS AND RECOMMENDATIONS

Storm Water Evaluation Narrative

We encountered greater than 5 feet of fill in our Borings B-3 and B-4 located within the central portion of the site during our investigation performed for the referenced geotechnical report.

Infiltration should be considered infeasible in these areas due to the limited vertical infiltration characteristics of fill. In addition, infiltration should be considered infeasible within 50 feet of the existing slopes within the parking lot and the existing naturally occurring slope to the east of the site.

We encountered less than 5 feet of previously placed fill overlying Very Old Paralic Deposits or Scripps Formation within the eastern end of the site during the referenced geotechnical investigation. We performed 2 infiltration tests within the formational Very Old Paralic Deposits or Scripps Formation and the results indicate an average rate of 0.02 inches per hour (with an applied factor of safety of 2). We performed the in-place infiltration tests in areas likely used for potential infiltration devices and where formational materials are located near existing grades.

Storm Water Evaluation Conclusion

Based on the results of our infiltration tests performed within the existing formational materials (less than 0.05 inches per hour), the existing fill thicknesses at the site, and existing sloping conditions, we opine full and partial infiltration on the property is considered infeasible.

Storm Water Management Devices

Liners and subdrains should be incorporated into the design and construction of the planned storm water devices. The liners should be impermeable (e.g. High-density polyethylene, HDPE, with a thickness of about 30 mil or equivalent Polyvinyl Chloride, PVC) to prevent water migration. The subdrains should be perforated within the liner area, installed at the base and above the liner, be at least 3 inches in diameter and consist of Schedule 40 PVC pipe. The subdrains outside of the liner should consist of solid pipe. The penetration of the liners at the subdrains should be properly waterproofed. The subdrains should be connected to a proper outlet. The devices should also be installed in accordance with the manufacturer's recommendations.

Storm Water Standard Worksheets

The SWS requests the geotechnical engineer complete the Categorization of Infiltration Feasibility Condition (Worksheet C.4-1 or I-8) worksheet information to help evaluate the potential for infiltration on the property. Worksheet C.4-1 presents the completed information for the submittal process and is attached herein.

The regional storm water standards also have a worksheet (Worksheet D.5-1 or Form I-9) that helps the project civil engineer estimate the factor of safety based on several factors. Table 5 describes the suitability assessment input parameters related to the geotechnical engineering aspects for the factor of safety determination.

TABLE 5
SUITABILITY ASSESSMENT RELATED CONSIDERATIONS FOR INFILTRATION FACILITY
SAFETY FACTORS

Consideration	High Concern – 3 Points	Medium Concern – 2 Points	Low Concern – 1 Point	
Assessment Methods	Use of soil survey maps or simple texture analysis to estimate short-term infiltration rates. Use of well permeameter or borehole methods without accompanying continuous boring log. Relatively sparse testing with direct infiltration methods	Use of well permeameter or borehole methods with accompanying continuous boring log. Direct measurement of infiltration area with localized infiltration measurement methods (e.g., Infiltrometer). Moderate spatial resolution	Direct measurement with localized (i.e. small-scale) infiltration testing methods at relatively high resolution or use of extensive test pit infiltration measurement methods.	
Predominant Soil Texture	Silty and clayey soils with significant fines	Loamy soils	Granular to slightly loamy soils	
Site Soil Variability Highly variable soils indicated from site assessment or unknown variability		Soil boring/test pits indicate moderately homogenous soils	Soil boring/test pits indicate relatively homogenous soils	
Depth to Groundwater/ Impervious Layer Steet below facility bottom		5-15 feet below facility bottom	>15 feet below facility bottom	

Based on our geotechnical investigation and the previous table, Table 6 presents the estimated factor values for the evaluation of the factor of safety. This table only presents the suitability assessment safety factor (Part A) of the worksheet. The project civil engineer should evaluate the safety factor for design (Part B) and use the combined safety factor for the design infiltration rate.

TABLE 6
FACTOR OF SAFETY WORKSHEET DESIGN VALUES – PART A1

Suitability Assessment Factor Category	Assigned Weight (w)	Factor Value (v)	Product (p = w x v)
Assessment Methods	0.25	2	0.50
Predominant Soil Texture	0.25	2	0.50
Site Soil Variability	0.25	2	0.50
Depth to Groundwater/ Impervious Layer	0.25	1	0.25
Suitability Assessment Safety	1.75		

^{*}The project civil engineer should complete Worksheet D.5-1 or Form I-9 using the data on this table. Additional information is required to evaluate the design factor of safety.

If you have any questions regarding this correspondence, or if we may be of further service, please contact the undersigned at your convenience.

Shawn Foy Weedon

GE 2714

Very truly yours,

GEOCON INCORPORATED

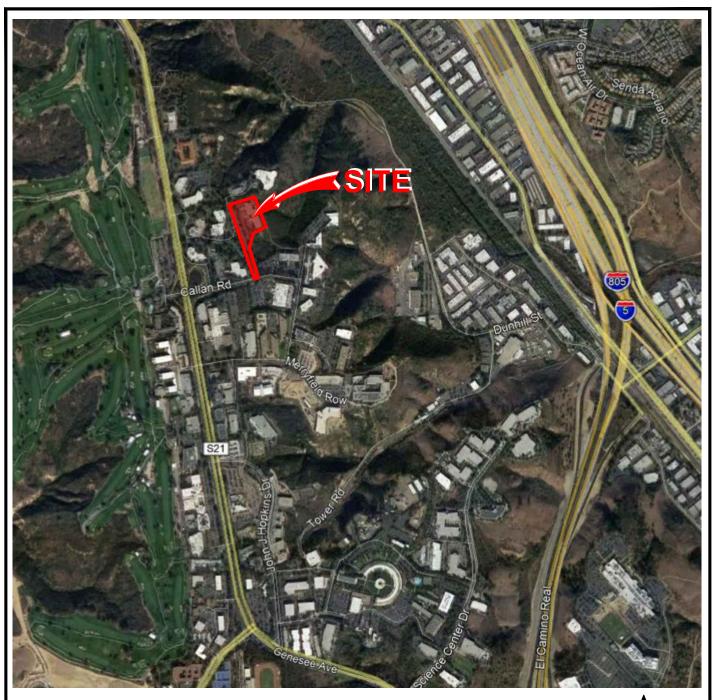
Lilian E. Rodriguez RCE 83227

LER:SFW:dmc:arm

(e-mail) Addressee

Geocon Project No. G2469-11-01

-8 -



THE GEOGRAPHICAL INFORMATION MADE AVAILABLE FOR DISPLAY WAS PROVIDED BY GOOGLE EARTH, SUBJECT TO A LICENSING AGREEMENT. THE INFORMATION IS FOR ILLUSTRATIVE PURPOSES ONLY; IT IS NOT INTENDED FOR CLIENT'S USE OR RELIANCE AND SHALL NOT BE REPRODUCED BY CLIENT. CLIENT SHALL INDEMNIFY, DEFEND AND HOLD HARMLESS GEOCON FROM ANY LIABILITY INCURRED AS A RESULT OF SUCH USE OR RELIANCE BY CLIENT.



VICINITY MAP

GEOCON INCORPORATED



GEOTECHNICAL ■ ENVIRONMENTAL ■ MATERIALS 6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121 - 2974 PHONE 858 558-6900 - FAX 858 558-6159

LR / RA

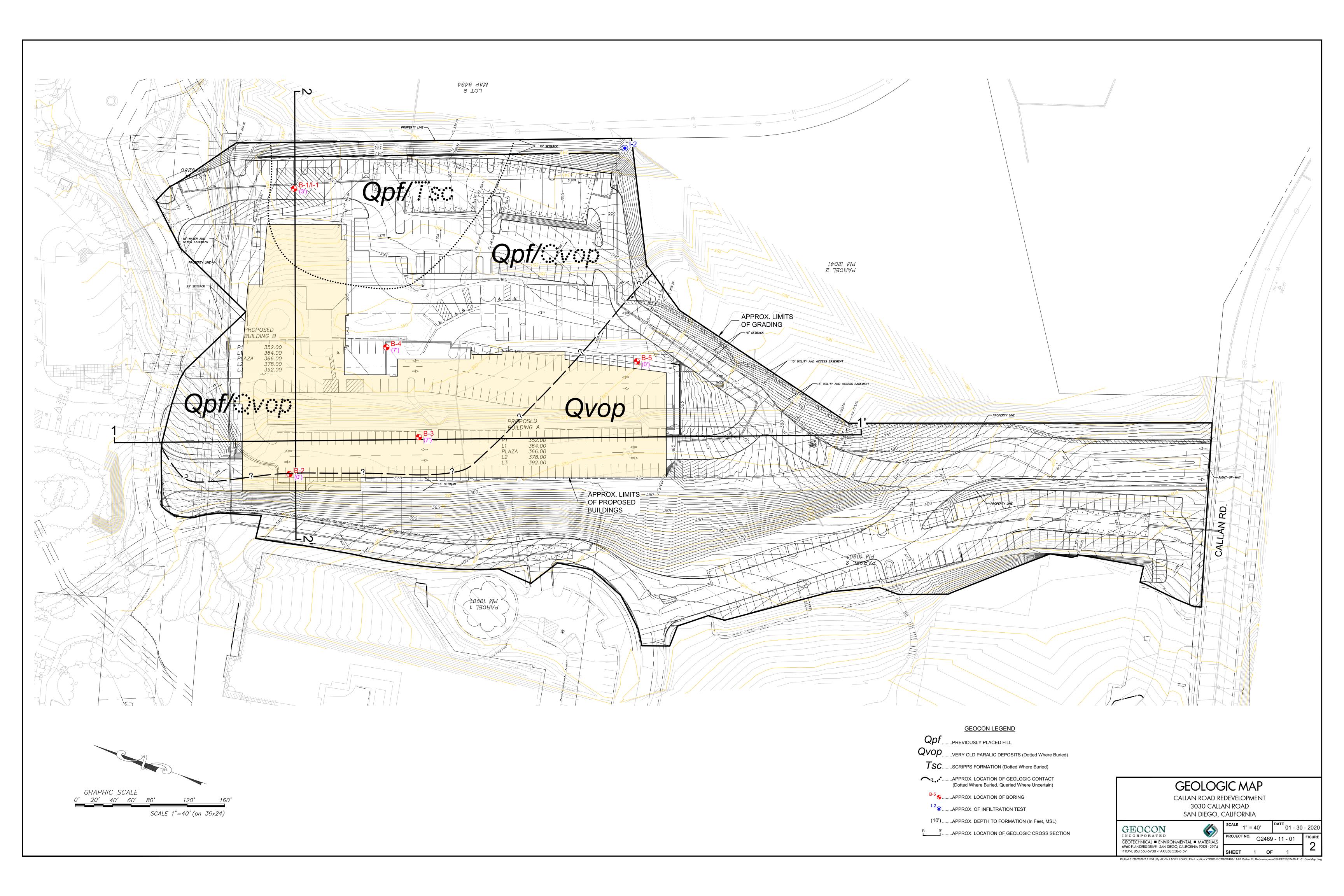
DSK/GTYPD

CALLAN ROAD REDEVELOPMENT 3030 CALLAN ROAD SAN DIEGO, CALIFORNIA

DATE 01 - 30 - 2020

PROJECT NO. G2469 - 11 - 01

FIG. 1

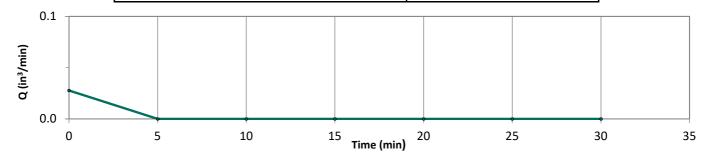


TEST NO.: I-I GEOLOGIC UNIT: Tsc

EXCAVATION ELEVATION (MSL, FT): 345

TEST INFORMATION				
BOREHOLE DIAMETER (IN):	8			
BOREHOLE DEPTH (FT):	4.4			
TEST/BOTTOM ELEVATION (MSL, FT):	341			
MEASURED HEAD HEIGHT (IN):	15.0			
CALCULATED HEAD HEIGHT (IN):	5.7			
FACTOR OF SAFETY:	2.0			

TEST RESULTS	
STEADY FLOW RATE (IN ³ /MIN):	0.003
FIELD-SATURATED INFILTRATION RATE (IN/HR):	0.0001
FACTORED INFILTRATION RATE (IN/HR):	0.0001



TEST DATA						
Reading	Time Elapsed (min)	Water Weight Consumed (lbs)	Water Volume Consumed (in ³)	Q (in³/min)		
I	0.00	0.000	0.00	0.00		
2	5.00	0.005	0.14	0.028		
3	5.00	0.000	0.00	0.000		
4	5.00	0.000	0.00	0.000		
5	5.00	0.000	0.00	0.000		
6	5.00	0.000	0.00	0.000		
7	5.00	0.000	0.00	0.000		
8	5.00	0.000	0.00	0.000		
9	5.00	0.000	0.00	0.000		

GEOCON INCORPORATED



GEOTECHNICAL CONSULTANTS

6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121 - 2974

PHONE 858 558-6900 - FAX 858 558-6159

DG

AARDVARK PERMEATER DATA ANALYSIS

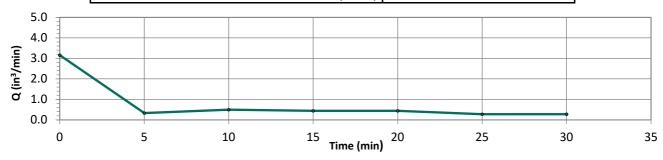
CALLAN ROAD REDEVELOPMENT 3030 CALLAN ROAD SAN DIEGO, CALIFORNIA

PROJECT NO. G2469-11-01

TEST NO.: I-2 GEOLOGIC UNIT: Qvop EXCAVATION ELEVATION (MSL, FT):

TEST INFORMATION			
BOREHOLE DIAMETER (IN):	4		
BOREHOLE DEPTH (FT):	5.2		
TEST/BOTTOM ELEVATION (MSL, FT):	333		
MEASURED HEAD HEIGHT (IN):	4.0		
CALCULATED HEAD HEIGHT (IN):	5.9		
FACTOR OF SAFETY:	2.0		

TEST RESULTS	
STEADY FLOW RATE (IN ³ /MIN):	0.277
FIELD-SATURATED INFILTRATION RATE (IN/HR):	0.078
SAFETY FACTORED INFILTRATION RATE (IN/HR):	0.039



TEST DATA						
Reading	Time Elapsed (min)	Water Weight Consummed (lbs)	Water Volume Consummed (in³)	Q (in ³ /min)		
I	0.00	0.000	0.00	0.00		
2	5.00	0.570	15.78	3.157		
3	5.00	0.060	1.66	0.332		
4	5.00	0.090	2.49	0.498		
5	5.00	0.080	2.22	0.443		
6	5.00	0.080	2.22	0.443		
7	5.00	0.050	1.38	0.277		
8	5.00	0.050	1.38	0.277		
9	5.00	0.050	1.38	0.277		

INCORPORATED



GEOTECHNICAL CONSULTANTS

6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121 - 2974

PHONE 858 558-6900 - FAX 858 558-6159

AARDVARK PERMEATER DATA ANALYSIS

CALLAN ROAD REDEVELOPMENT 3030 CALLAN ROAD SAN DIEGO, CALIFORNIA

PROJECT NO. G2469-11-01

Categoriz	ration of Infiltration Feasibility Condition based on Geotechnical Conditions	Worksheet C.4-1:Form I- 8A ¹⁰			
	Part 1 - Full Infiltration Feasibility Screening Crit	eria			
DMA(s)Be	eingAnalyzed:	ProjectPhase:			
Callan Road	I Redevelopment	Design			
Criteria 1:	Infiltration Rate Screening				
	Is the mapped hydrologic soil group according to the NRCS Web ! Mapper Type A or B and corroborated by available site soil data ¹	1?			
	Yes; the DMA may feasibly support full infiltration. Answer "Yes" to Criteria 1 Result or continue to Step 1B if the applicant elects to perform infiltration testing.				
1.0	No; the mapped soil types are A or B but is not corroborated by available site soil data (continue to Step 1B).				
1A	☐ No; the mapped soil types are C, D, or "urban/unclassified" and is corroborated by available site soil data. Answer "No" to Criteria 1 Result.				
	☐ No; the mapped soil types are C, D, or "urban/unclassified" bu soil data (continue to Step 1B).	t is not corroborated by available site			
	Is the reliable infiltration rate calculated using planning phase me	ethods from Table D.3-1?			
1B					
	Is the reliable infiltration rate calculated using planning phase n than 0.5 inches per hour?	nethods from Table D.3-1 greater			
1C	Yes; the DMA may feasibly support full infiltration. Answer "Yes				
	☑ No; full infiltration is not required. Answer "No" to Criteria 1	KESUIT.			
	Infiltration Testing Method. Is the selected infiltration testing r phase (see Appendix D.3)? Note: Alternative testing standards n				
1D	rationales and documentation.	,			
	☐ Yes; continue to Step 1E. ☐ No; select an appropriate infiltration testing method.				

Note that it is not required to investigate each and every criterion in the worksheet, a single "no" answer in Part 1, Part 2, Part 3, or Part 4 determines a full, partial, or no infiltration condition.



¹⁰ This form must be completed each time there is a change to the site layout that would affect the infiltration feasibility condition. Previously completed forms shall be retained to document the evolution of the site storm water design.

¹¹ Available data include site-specific sampling or observation of soil types or texture classes, such as obtained from borings or test pits necessary to support other design elements.

Categoriza	tion of Infiltration Feasibility Condition based on Geotechnical Conditions	Worksheet C.4-1:Form I- 8A ¹⁰
1E	Number of Percolation/Infiltration Tests. Does the infiltration the minimum number of tests specified in Table D.3-2? Yes; continue to Step 1F. No; conduct appropriate number of tests.	on testing method performed satisfy
IF	Factor of Safety. Is the suitable Factor of Safety selected for in D.5; Tables D.5-1 and D.5-2; and Worksheet D.5-1 (Form I-Yes; continue to Step 1G. No; select appropriate factor of safety.	
1G	Full Infiltration Feasibility. Is the average measured infiltration greater than 0.5 inches per hour? ☐ Yes; answer "Yes" to Criteria 1 Result. ☐ No; answer "No" to Criteria 1 Result.	n rate divided by the Factor of Safety
Criteria 1 Result	Is the estimated reliable infiltration rate greater than 0.5 inc runoff can reasonably be routed to a BMP? Yes; the DMA may feasibly support full infiltration. Contin No; full infiltration is not required. Skip to Part 1 Result.	
	filtration testing methods, testing locations, replicates, and reation rates according to procedures outlined in D.5. Document report.	
where less than	two infiltration tests within the underlying Very Old Paralic Deposits an 5 feet of fill exists. The results indicate an average rate of 0.02 inches , full infiltration is considered infeasible at the site.	



Categorization of Infiltration Feasibility Condition based on Worksheet C.4-1:Form I-**Geotechnical Conditions** 8A¹⁰ Criteria 2: Geologic/Geotechnical Screening If all questions in Step 2A are answered "Yes," continue to Step 2B. For any "No" answer in Step 2A answer "No" to Criteria 2, and submit an "Infiltration Feasibility Condition Letter" that meets the requirements in Appendix C.1.1. The geologic/geotechnical analyses listed in Appendix C.2.1 do not apply to the DMA because one of the following setbacks cannot be 2A avoided and therefore result in the DMA being in a no infiltration condition. The setbacks must be the closest horizontal radial distance from the surface edge (at the overflow elevation) of the BMP. Can the proposed full infiltration BMP(s) avoid areas with existing fill materials greater than 5 feet thick below the infiltrating surface? No 2A-1 Yes Can the proposed full infiltration BMP(s) avoid placement within 10 feet of 2A-2 existing underground utilities, structures, or retaining walls? ☐ Yes ☐ No Can the proposed full infiltration BMP(s) avoid placement within 50 feet of a natural slope (>25%) or within a distance of 1.5H from fill slopes where H is the 2A-3 ☐ Yes ☐ No height of the fill slope? When full infiltration is determined to be feasible, a geotechnical investigation report must be prepared that considers the relevant factors identified in Appendix C.2.1. 2B If all questions in Step 2B are answered "Yes," then answer "Yes" to Criteria 2 Result. If there are "No" answers continue to Step 2C. Hydroconsolidation. Analyze hydroconsolidation potential per approved ASTM standard due to a proposed full infiltration BMP. 2B-1 Yes ☐ No Can full infiltration BMPs be proposed within the DMA without increasing hydroconsolidation risks? Expansive Soils. Identify expansive soils (soils with an expansion index greater than 20) and the extent of such soils due to proposed full infiltration BMPs. 2B-2 Can full infiltration BMPs be proposed within the DMA without increasing Yes ☐ No expansive soil risks?



Categori	zation of Infiltration Feasibility Condition based on Geotechnical Conditions	Workshee	t C.4-1:Fo 8A ¹⁰	rm I-
2B-3	Liquefaction. If applicable, identify mapped liquefaction areas. Exliquefaction hazards in accordance with Section 6.4.2 of the Cit Diego's Guidelines for Geotechnical Reports (2011 or most recliquefaction hazard assessment shall take into account any incommod groundwater elevation or groundwater mounding that could occord proposed infiltration or percolation facilities. Can full infiltration BMPs be proposed within the DMA without liquefaction risks?	ey of San cent edition). crease in cur as a result	☐ Yes	□No
2B-4	Slope Stability. If applicable, perform a slope stability analysis accordance with the ASCE and Southern California Earthquake Recommended Procedures for Implementation of DMG Specia 117, Guidelines for Analyzing and Mitigating Landslide Hazard to determine minimum slope setbacks for full infiltration BMP of San Diego's Guidelines for Geotechnical Reports (2011) to owhich type of slope stability analysis is required. Can full infiltration BMPs be proposed within the DMA without slope stability risks?	Center (2002) al Publication s in California s. See the City letermine	☐ Yes	□No
2B-5	Other Geotechnical Hazards. Identify site-specific geotechnical already mentioned (refer to Appendix C.2.1). Can full infiltration BMPs be proposed within the DMA without risk of geologic or geotechnical hazards not already mentioned.	t increasing	☐ Yes	□No
2B-6	Setbacks. Establish setbacks from underground utilities, struct retaining walls. Reference applicable ASTM or other recognized the geotechnical report. Can full infiltration BMPs be proposed within the DMA using esta setbacks from underground utilities, structures, and/or retaining	standard in	☐ Yes	□ No



Categoriz	cation of Infiltration Feasibility Condition based on Geotechnical Conditions	Workshee	t C.4-1:Fo 8A ¹⁰	rm I-
2 C	Mitigation Measures. Propose mitigation measures for each geologic/geotechnical hazard identified in Step 2B. Provide a disc geologic/geotechnical hazards that would prevent full infiltration cannot be reasonably mitigated in the geotechnical report. See A C.2.1.8 for a list of typically reasonable and typically unreasonable measures. Can mitigation measures be proposed to allow for full infiltration the question in Step 2 is answered "Yes," then answer "Yes" to Result. If the question in Step 2C is answered "No," then answer "No" Criteria 2Result.	n BMPs that appendix le mitigation ion BMPs? If o Criteria 2	☐ Yes	□ No
Criteria 2 Result	Can infiltration greater than 0.5 inches per hour be allowed w increasing risk of geologic or geotechnical hazards that cannot reasonably mitigated to an acceptable level?		☐ Yes	□No
Summarize	findings and basis; provide references to related reports or exhib	oits.		
Formation of safety of	med two infiltration tests within the underlying Very 0 at the site. The results indicate an average rate of 0.02 inch f 2). Therefore, infiltration is considered infeasible at the site	es per hour (w	ith an appl	
	art 1 Result – Full Infiltration Geotechnical Screening 12		Result	
design is p	to both Criteria 1 and Criteria 2 are "Yes", a full infiltration potentially feasible based on Geotechnical conditions only. Inswer to Criteria 1 or Criteria 2 is "No", a full infiltration ot required.		filtration Co	

 $^{^{12}}$ To be completed using gathered site information and best professional judgement considering the definition of MEP in the MS4 Permit. Additional testing and/or studies may be required by City Engineer to substantiate findings.



Categoria	zation of Infiltration Feasibility Condition based on Geotechnical Conditions	Worksheet C.4-1:Form I- 8A ¹⁰			
Part 2 – Partial vs. No Infiltration Feasibility Screening Criteria					
DMA(s)B	eing Analyzed:	ProjectPhase:			
Callan Road	l Redevelopment	Design			
Criteria 3:	Infiltration Rate Screening				
	NRCS Type C, D, or "urban/unclassified": Is the mapped hydro NRCS Web Soil Survey or UC Davis Soil Web Mapper is Type C, corroborated by available site soil data?				
3A	Yes; the site is mapped as C soils and a reliable infiltration rainfiltration BMPS. Answer "Yes" to Criteria 3 Result.	te of 0.15 in/hr. is used to size partial			
	☐ Yes; the site is mapped as D soils or "urban/unclassified" ar in/hr. is used to size partial infiltration BMPS. Answer "Yes" t				
	No; infiltration testing is conducted (refer to Table D.3−1), co	ontinue to Step 3B.			
	Infiltration Testing Result: Is the reliable infiltration rate (i.e. as greater than 0.05 in/hr. and less than or equal to 0.5 in/hr?	verage measured infiltration rate/2)			
3B	☐Yes; the site may support partial infiltration. Answer "Yes" to Criteria 3 Result.				
	No; the reliable infiltration rate (i.e. average measured rate/infiltration is not required. Answer "No" to Criteria 3 Result.	2) is less than 0.05 in/hr., partial			
Criteria 3	Is the estimated reliable infiltration rate (i.e., average measure equal to 0.05 inches/hour and less than or equal to 0.5 inches DMA where runoff can reasonably be routed to a BMP?	· -			
Result	☐ Yes; Continue to Criteria 4.				
	☑ No: Skip to Part 2 Result.				
Summarize rate).	infiltration testing and/or mapping results (i.e. soil maps and seri	ies description used for infiltration			
We performed two infiltration tests within the underlying Very Old Paralic Deposits and Scripps Formation at the site in areas where less than 5 feet of fill exists. The results indicate an average rate of 0.02 inches per hour (with an applied factor of safety of 2). Therefore, partial infiltration is considered infeasible at the site.					
Ì					



Categorization of Infiltration Feasibility Condition based on Workshe Geotechnical Conditions			eet C.4-1:F	orm I-
Criteria 4:	Geologic/Geotechnical Screening			
4A	If all questions in Step 4A are answered "Yes," continue to Step For any "No" answer in Step 4A answer "No" to Criteria 4 Result, Condition Letter" that meets the requirements in Appendix C.1.1 listed in Appendix C.2.1 do not apply to the DMA because one of avoided and therefore result in the DMA being in a no infiltration closest horizontal radial distance from the surface edge (at the or	and submit ar . The geologic the following condition. Th	/geotechnica setbacks can e setbacks m	I analyses not be ust be the
4A-1	Can the proposed partial infiltration BMP(s) avoid areas with existing materials greater than 5 feet thick?	ng fill	☐ Yes	□ No
4A-2	Can the proposed partial infiltration BMP(s) avoid placement with 10 feet of existing underground utilities, structures, or retaining v		☐ Yes	□No
4A-3	Can the proposed partial infiltration BMP(s) avoid placement with a natural slope (>25%) or within a distance of 1.5H from fill slopes the height of the fill slope?		☐ Yes	□No
4B	When full infiltration is determined to be feasible, a geotechnical in that considers the relevant factors identified in Appendix C.2.1 If all questions in Step 4B are answered "Yes," then answer "Yes" "No" answers continue to Step 4C.	-		
4B-1	Hydroconsolidation. Analyze hydroconsolidation potential per ap ASTM standard due to a proposed full infiltration BMP. Can partial infiltration BMPs be proposed within the DMA withou hydroconsolidation risks?		☐ Yes	□No
4B-2	Expansive Soils. Identify expansive soils (soils with an expansion greater than 20) and the extent of such soils due to proposed infiltration BMPs. Can partial infiltration BMPs be proposed within the DMA with increasing expansive soil risks?	full	☐ Yes	□ No



Categorization of Infiltration Feasibility Condition based on Workshee Geotechnical Conditions		et C.4-1:Form I- 8A ¹⁰		
4B-3	Liquefaction. If applicable, identify mapped liquefaction areas liquefaction hazards in accordance with Section 6.4.2 of the Cit Diego's Guidelines for Geotechnical Reports (2011). Liquefacti assessment shall take into account any increase in groundwate or groundwater mounding that could occur as a result of proposinfiltration or percolation facilities. Can partial infiltration BMPs be proposed within the DMA with increasing liquefaction risks?	ty of San on hazard er elevation sed	☐ Yes	□No
4B-4	Slope Stability. If applicable, perform a slope stability analysis accordance with the ASCE and Southern California Earthquake Ce Recommended Procedures for Implementation of DMG Special 117, Guidelines for Analyzing and Mitigating Landslide Hazard California to determine minimum slope setbacks for full infiltr See the City of San Diego's Guidelines for Geotechnical Report determine which type of slope stability analysis is required. Can partial infiltration BMPs be proposed within the DMA with increasing slope stability risks?	enter (2002) Publication s in ation BMPs. s (2011) to	☐ Yes	□No
4B-5	Other Geotechnical Hazards. Identify site-specific geotechnical not already mentioned (refer to Appendix C.2.1). Can partial infiltration BMPs be proposed within the DMA with increasing risk of geologic or geotechnical hazards not already mentioned?	hout	☐ Yes	□No
4B-6	Setbacks. Establish setbacks from underground utilities, struct and/or retaining walls. Reference applicable ASTM or other restandard in the geotechnical report. Can partial infiltration BMPs be proposed within the DMA using recommended setbacks from underground utilities, structures, a retaining walls?	cognized	☐ Yes	□No
4C	Mitigation Measures. Propose mitigation measures for each geologic/geotechnical hazard identified in Step 4B. Provide a disc geologic/geotechnical hazards that would prevent partial infiltrat that cannot be reasonably mitigated in the geotechnical report. S Appendix C.2.1.8 for a list of typically reasonable and typically un mitigation measures. Can mitigation measures be proposed to allow for partial infiltrated by the question in Step 4C is answered "Yes," then answer criteria 4 Result. If the question in Step 4C is answered "No," then answer "No," the no, "No," then answer "No," the no, "No," the no, "No," the no, "No," the no, "No, "No, "No, "No, "No, "No, "No, "N	tion BMPs See Ireasonable ation ver "Yes" to	☐ Yes	□No



Geotechnical Conditions				eet C.4-1:Form I- 8A ¹⁰	
Criteria 4 Result	Can infiltration of greater than or equal to 0.05 inches/hour at than or equal to 0.5 inches/hour be allowed without increas of geologic or geotechnical hazards that cannot be reasonab mitigated to an acceptable level?	ing the risk	☐ Yes	□ No	
Summarize fir	ndings and basis; provide references to related reports or exhib	its.			
	Part 2 – Partial Infiltration Geotechnical Screening Result ¹³		Result		
	ooth Criteria 3 and Criteria 4 are "Yes", a partial infiltration de asible based on geotechnical conditions only.	sign is	☐ Partial Infiltr Condition		
	either Criteria 3 or Criteria 4 is "No", then infiltration of a to be infeasible within the site.	iny volume	⊠ No Infiltrat Condition		



¹³ To be completed using gathered site information and best professional judgement considering the definition of MEP in the MS4 Permit. Additional testing and/or studies may be required by City Engineer to substantiate findings

Project Name	:				
THIS DACE	INTENTIONA	IIVIEET RI	VNK EOB DO	UBLE-SIDED P	DINTING
IIIISTAGE	INTENTIONA	CLI CEFI DE	ANK FOR DO	ODLE SIDED F	KIN I ING